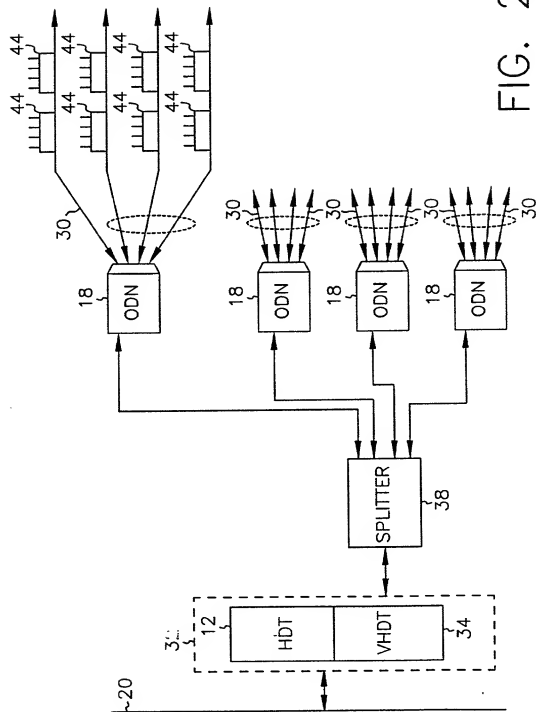


FIG. 1



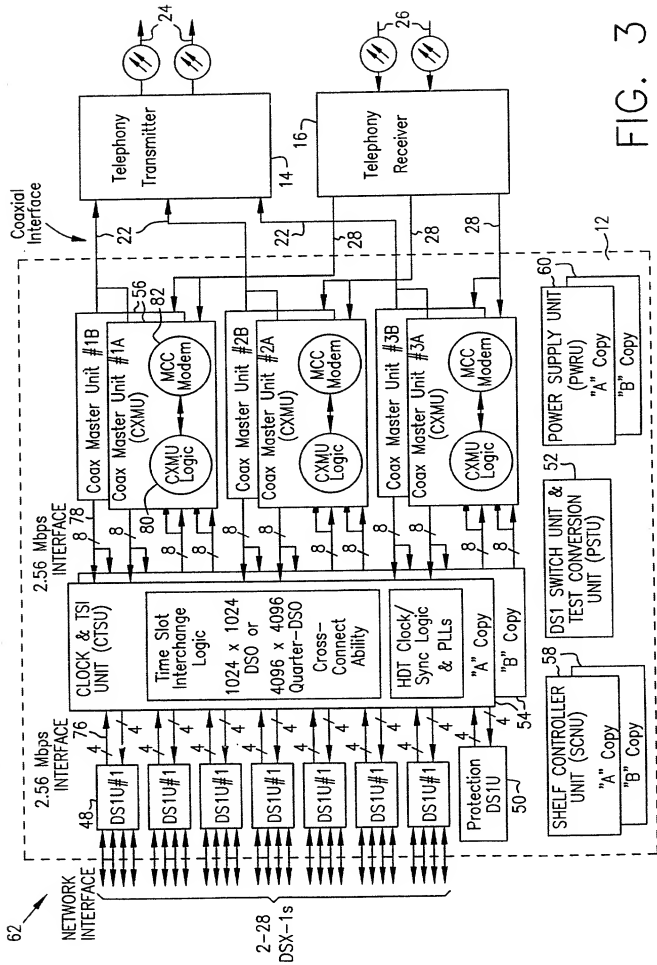


FIG. 3

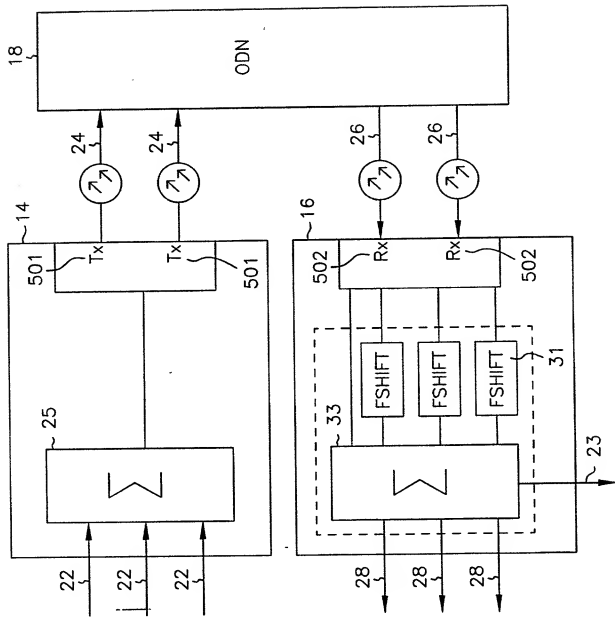


FIG. 4

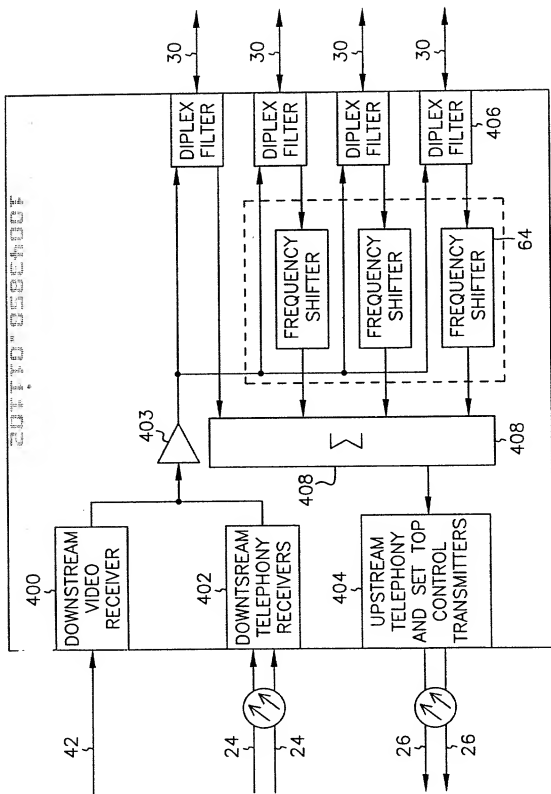


FIG. 5

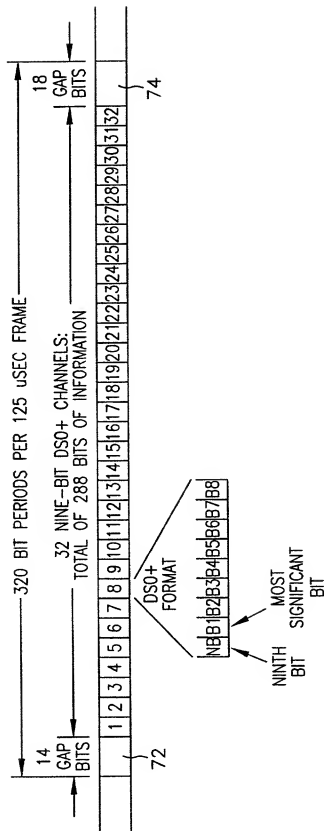


FIG. 9

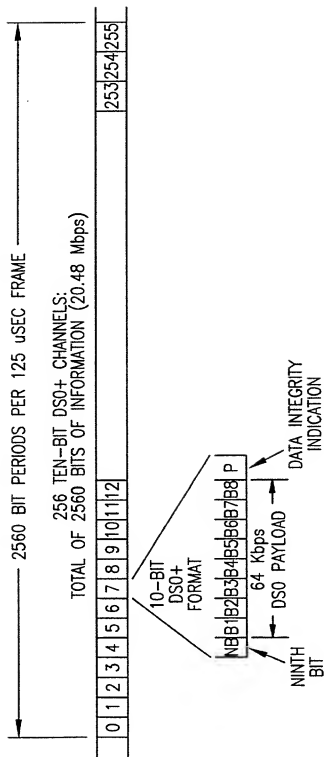


FIG. 10

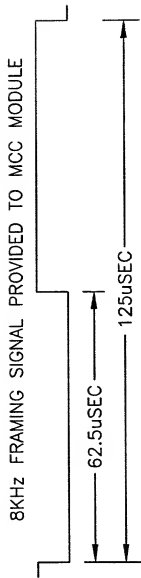


FIG. 11



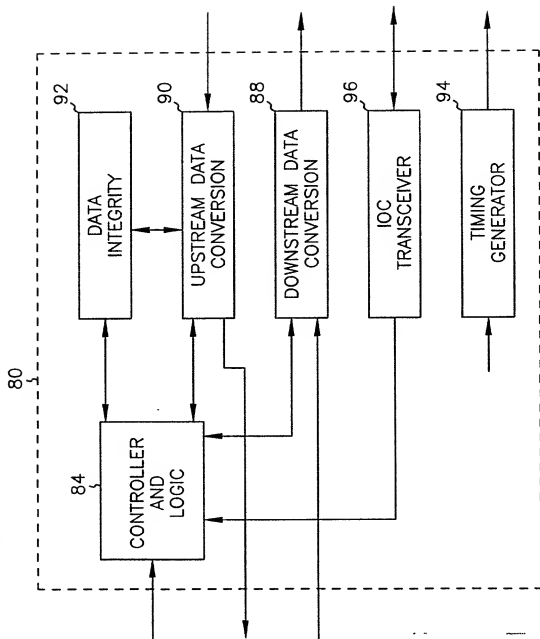


FIG. 12

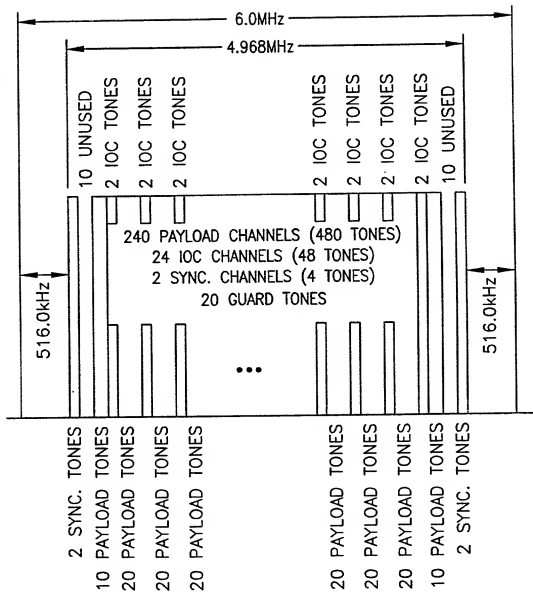


FIG. 13

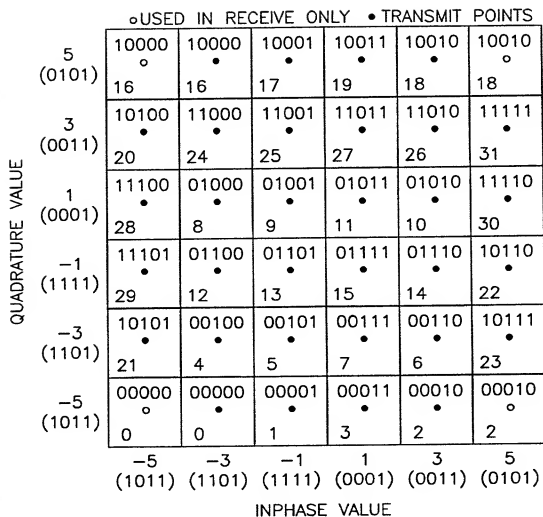


FIG. 14

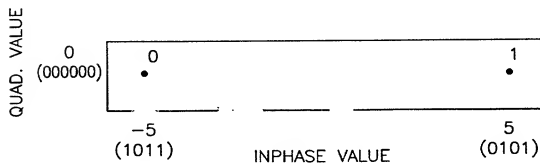


FIG. 15

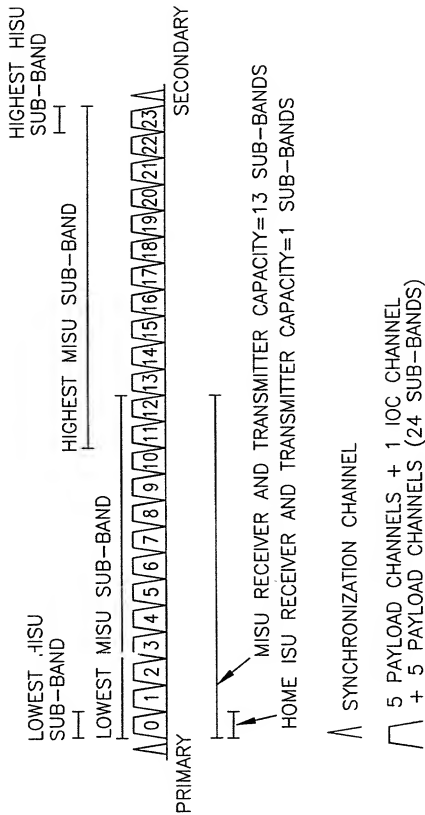


FIG. 16

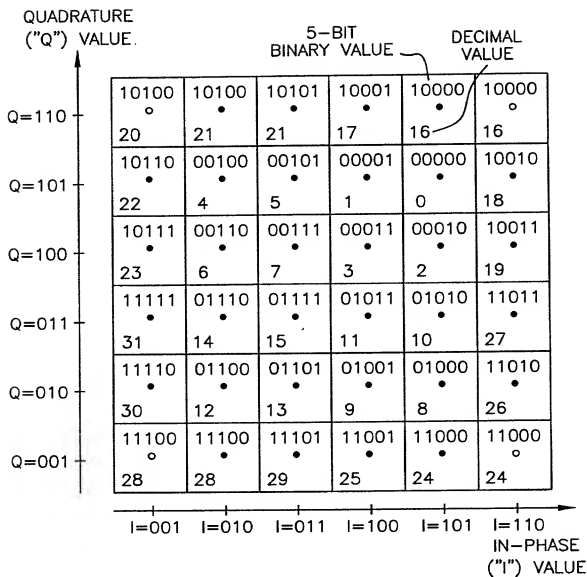


FIG. 17

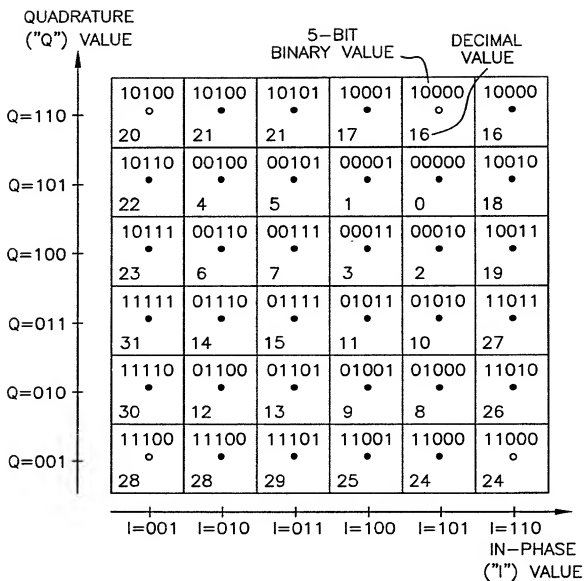


FIG. 18



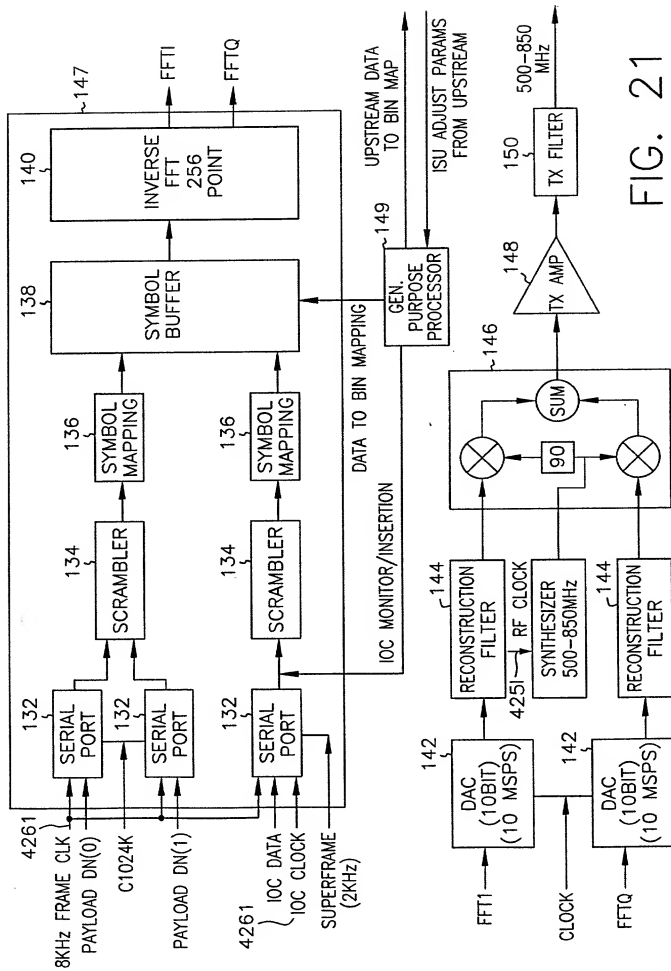


FIG. 21



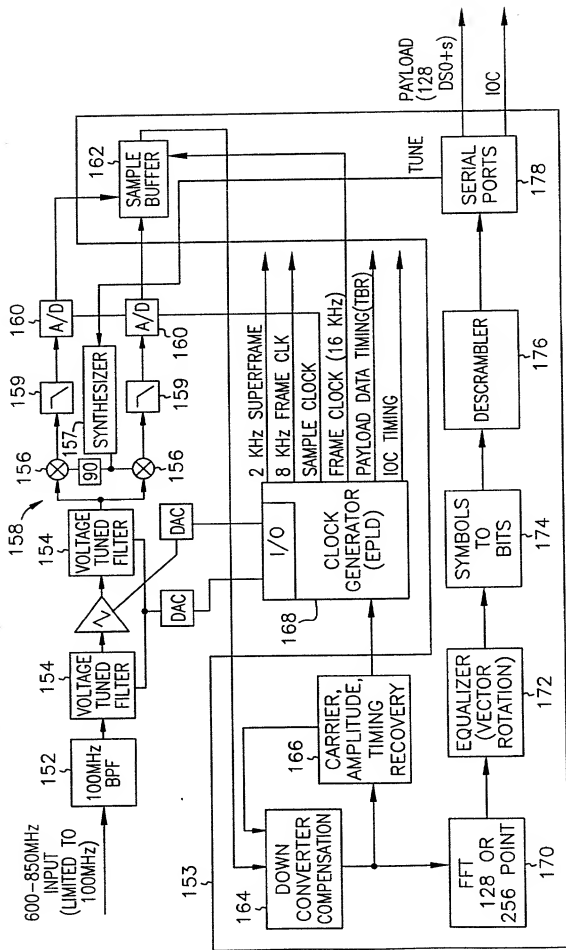
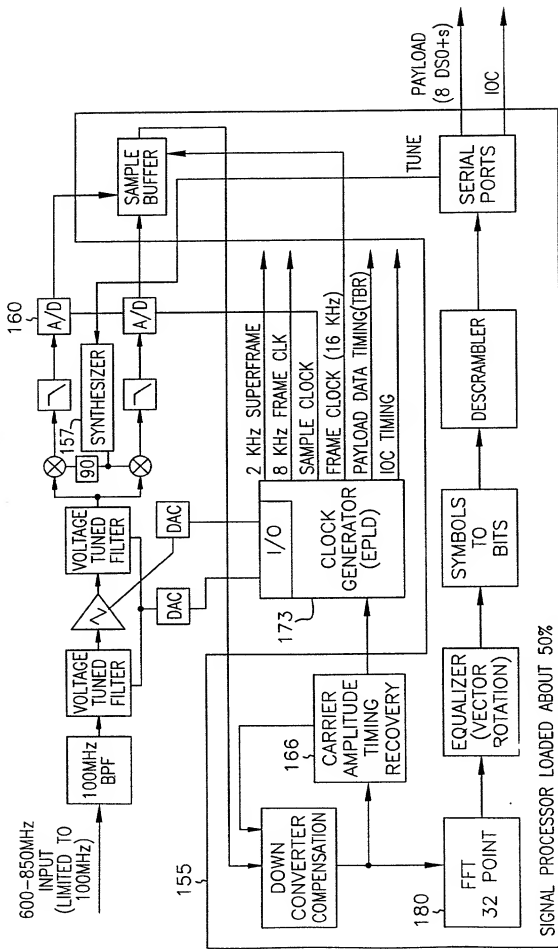


FIG. 22



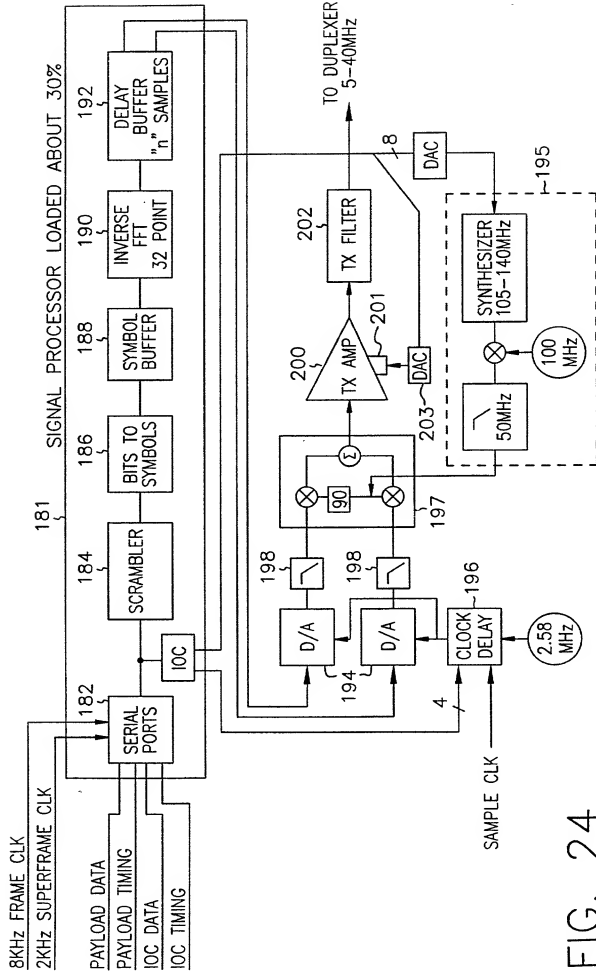


FIG. 24

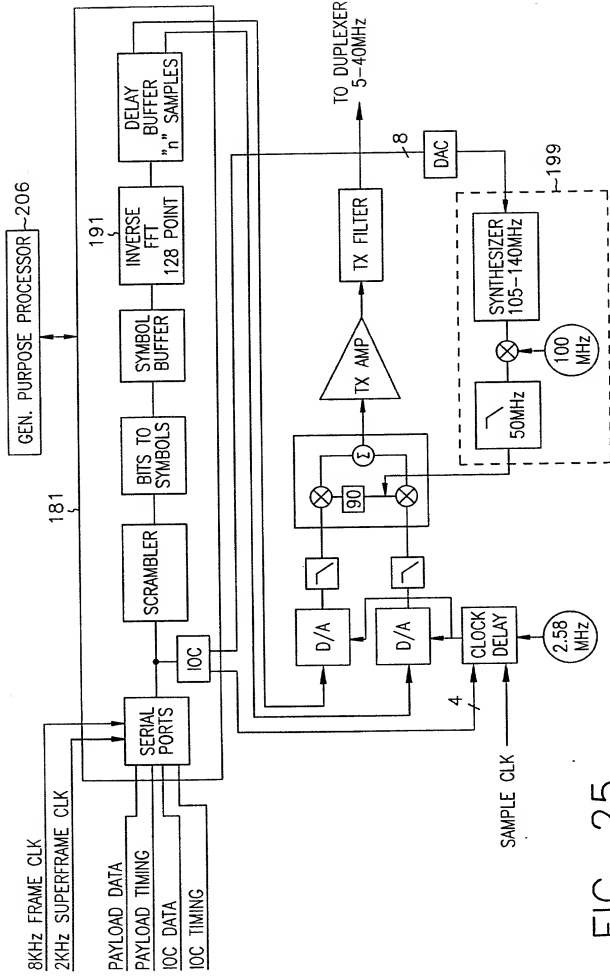


FIG. 25

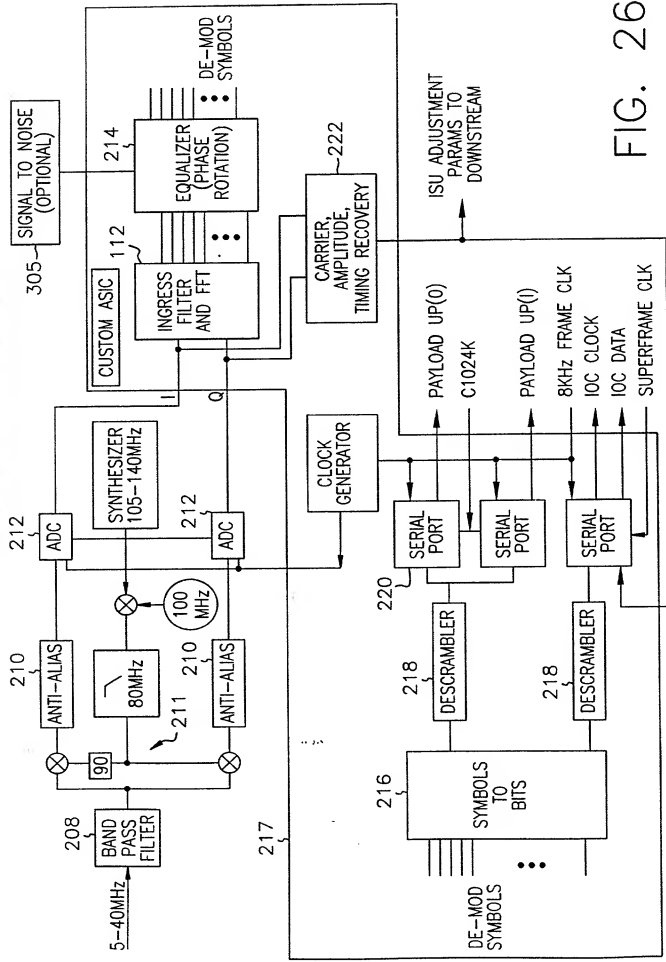


FIG. 26

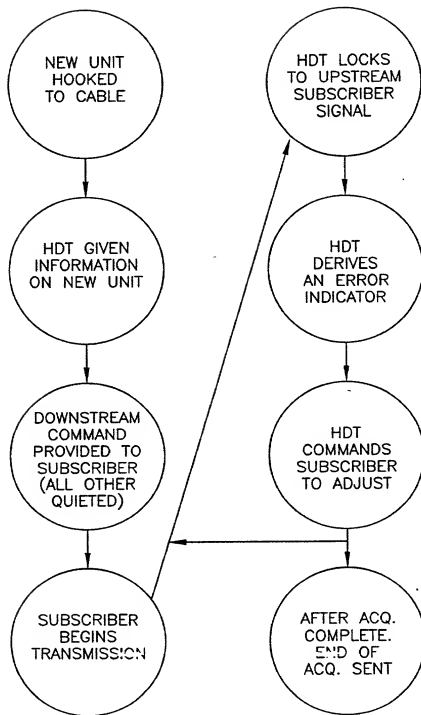


FIG. 27

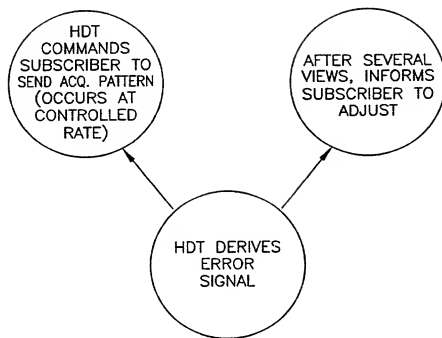


FIG. 28

Magnitude response of a single polyphase filter bank

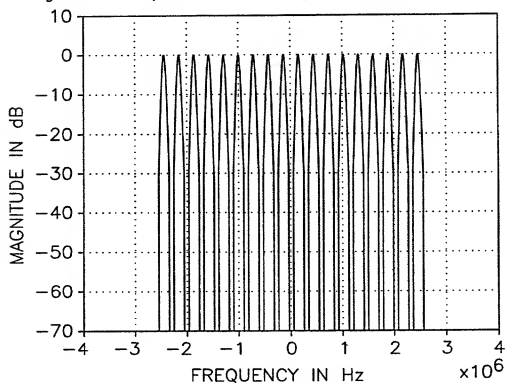


FIG. 29



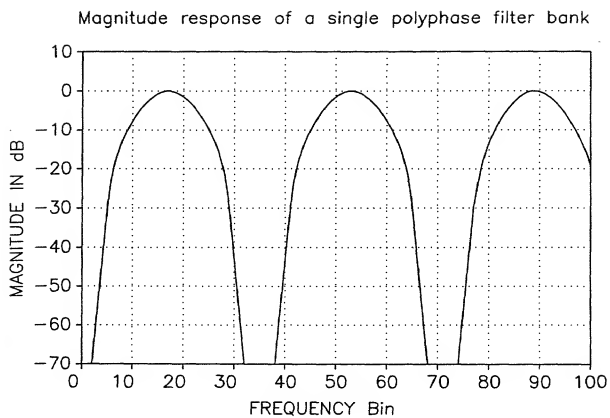


FIG. 30

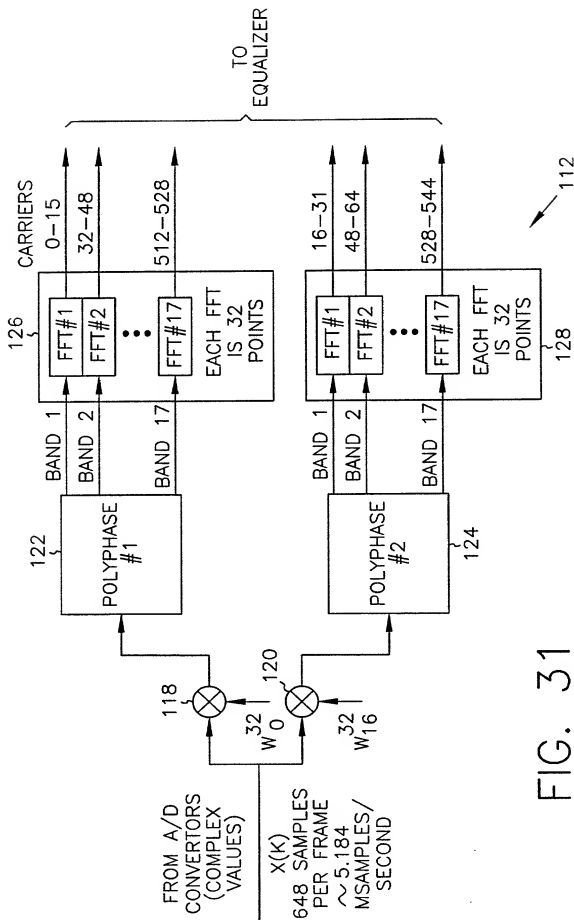
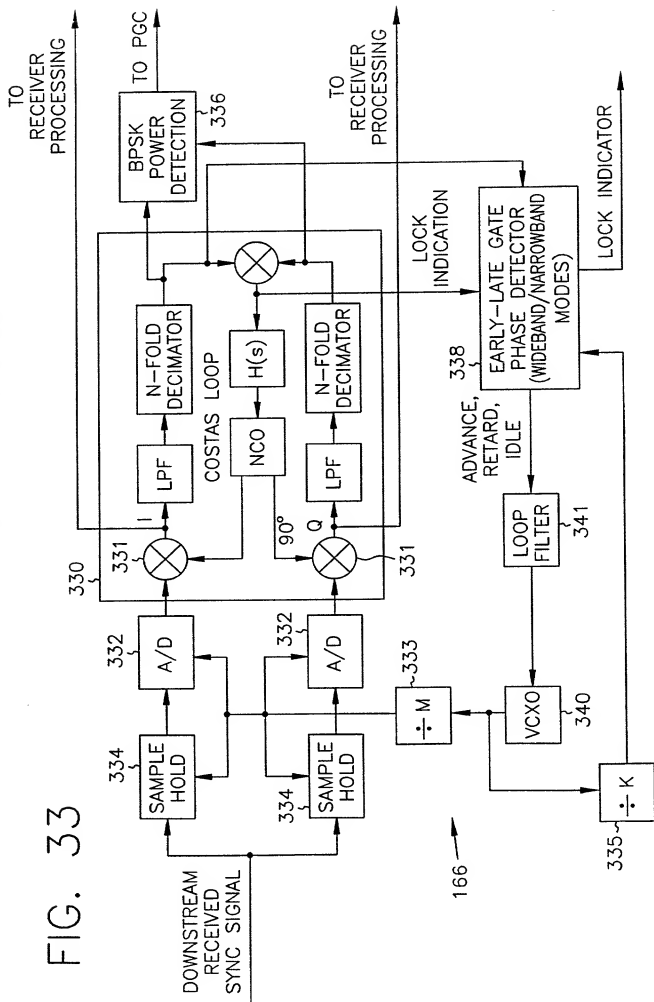




FIG. 33





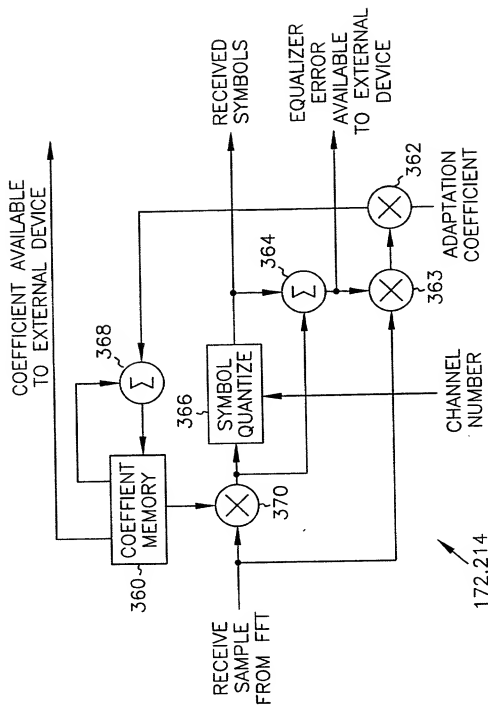


FIG. 35

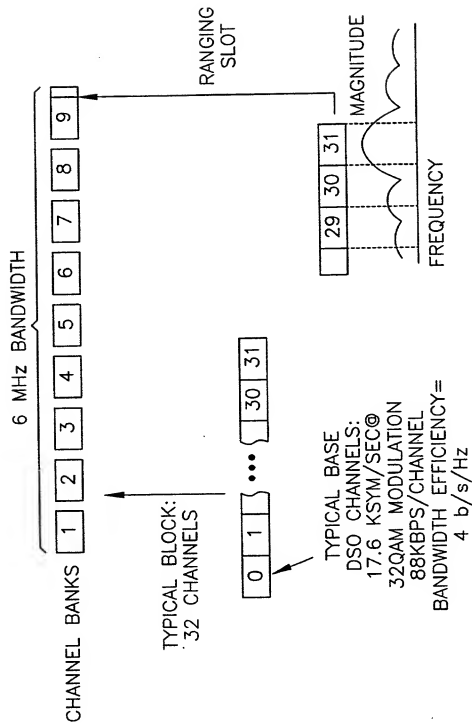


FIG. 36

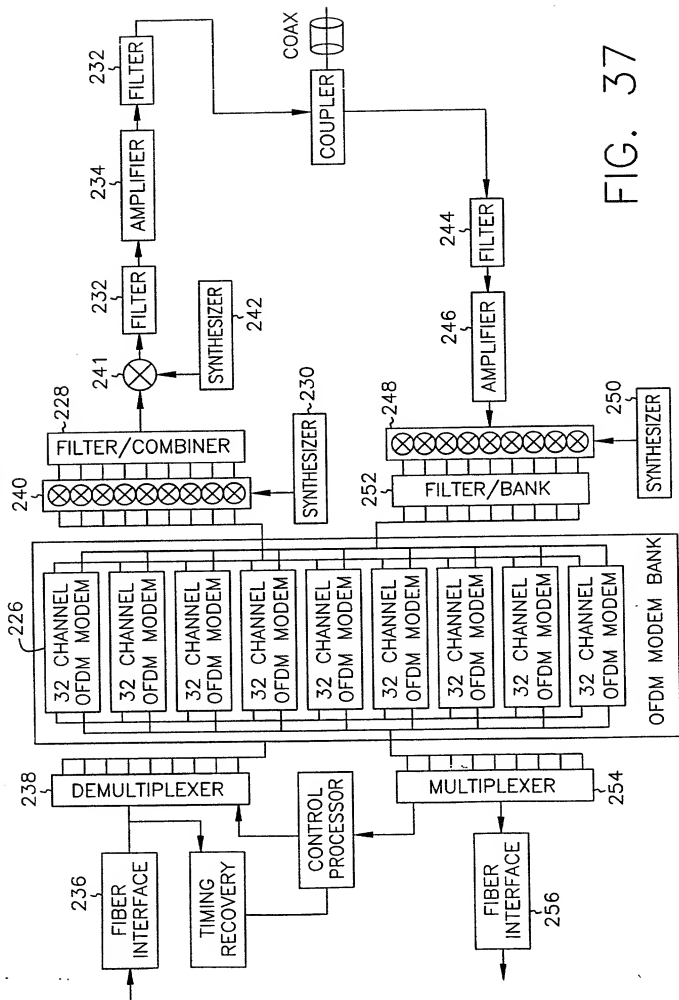


FIG. 37



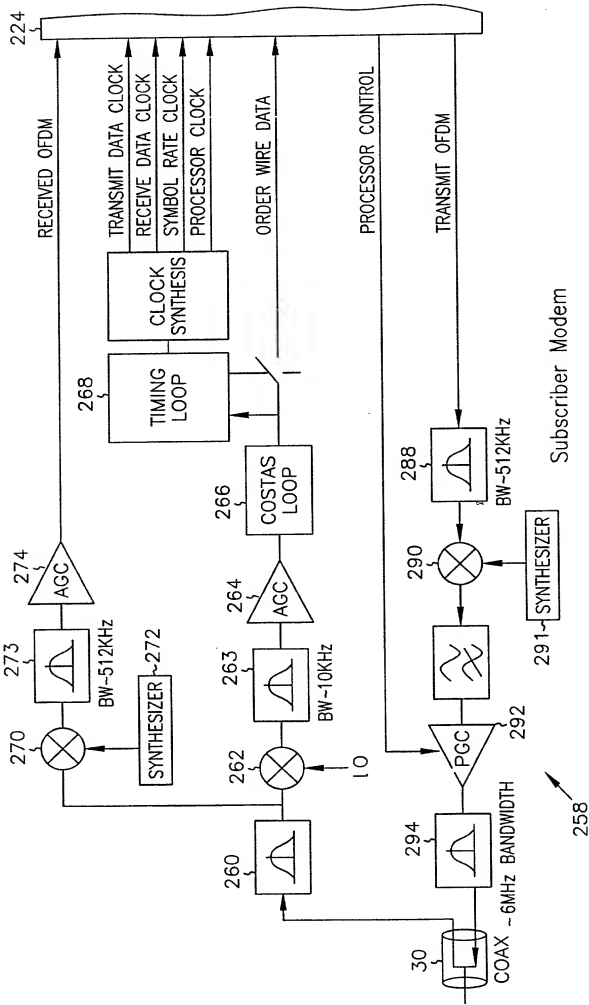


FIG. 38

Subscriber Modem

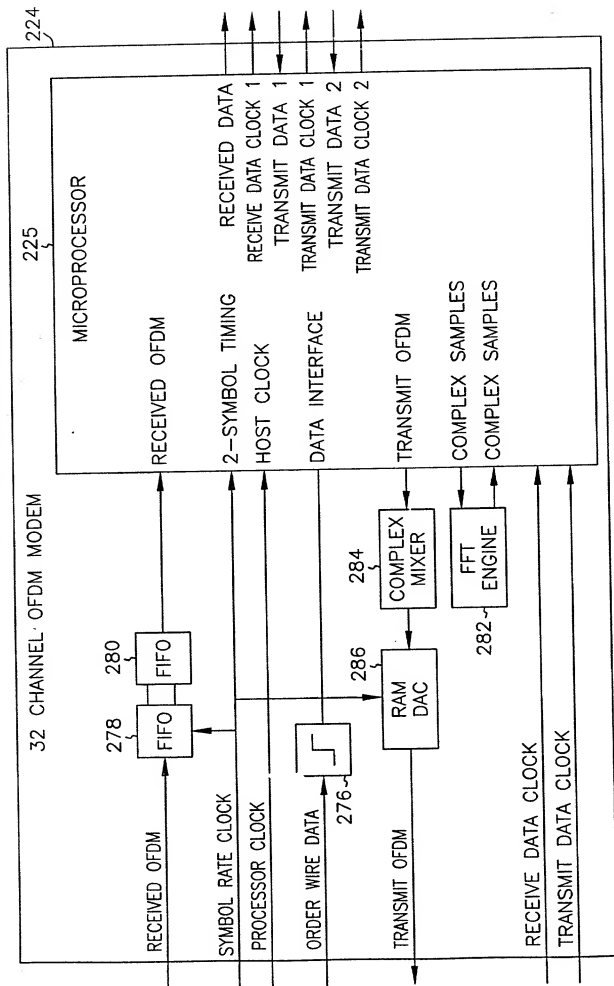


FIG. 39

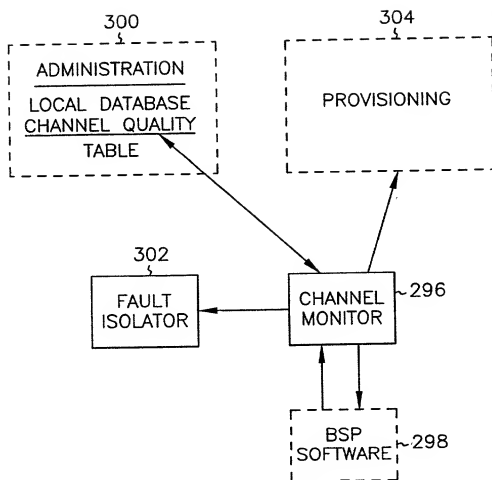


FIG. 40

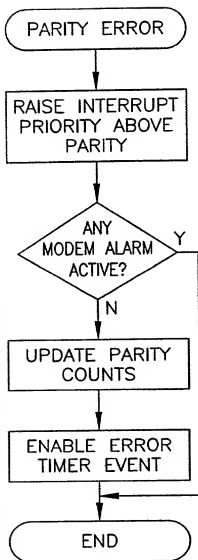


FIG. 41

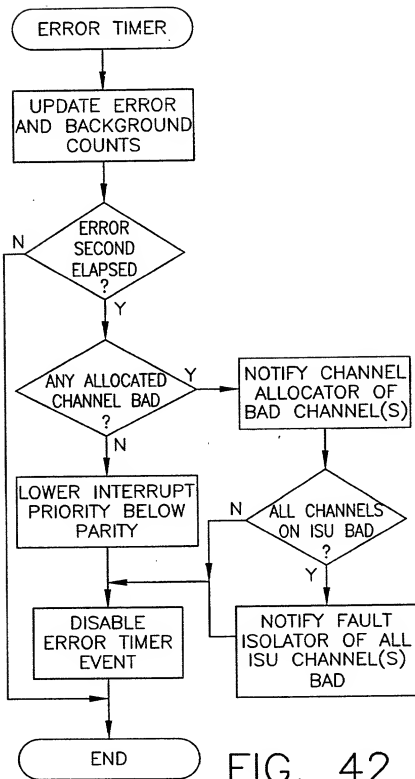


FIG. 42

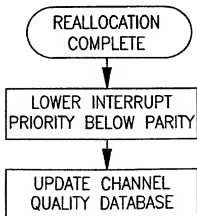
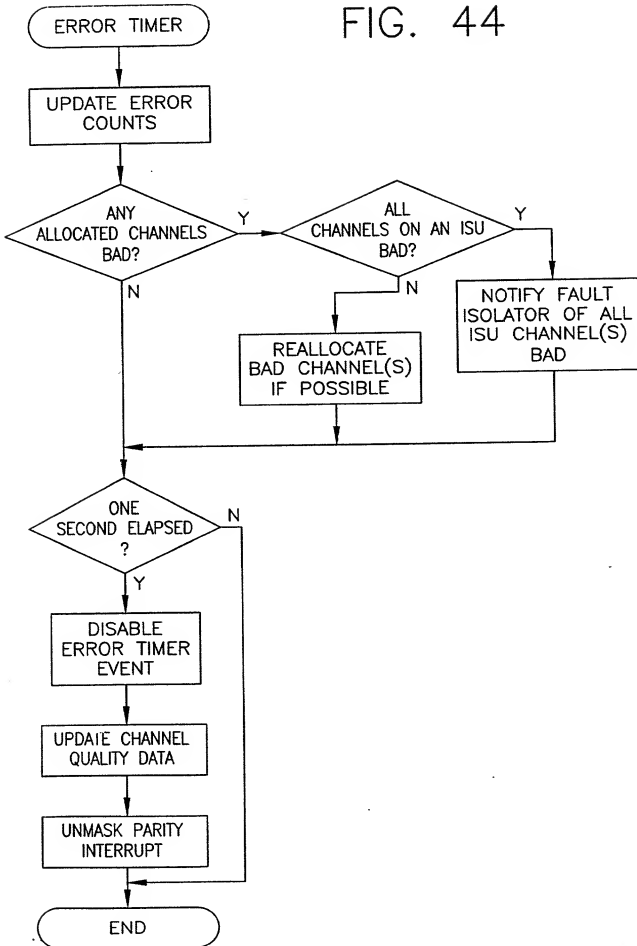


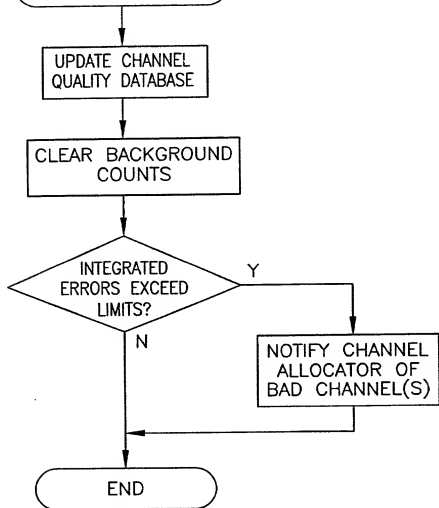
FIG. 43

FIG. 44



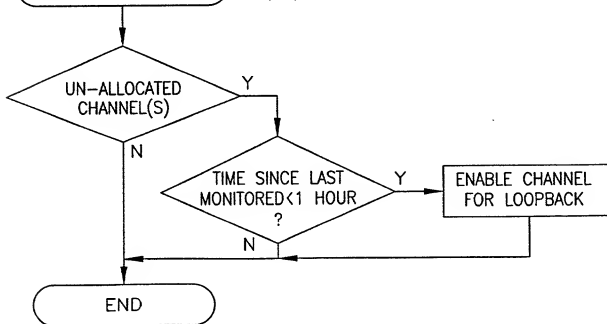
BACKGROUND TIMER

FIG. 45



BACKGROUND TIMER

FIG. 46



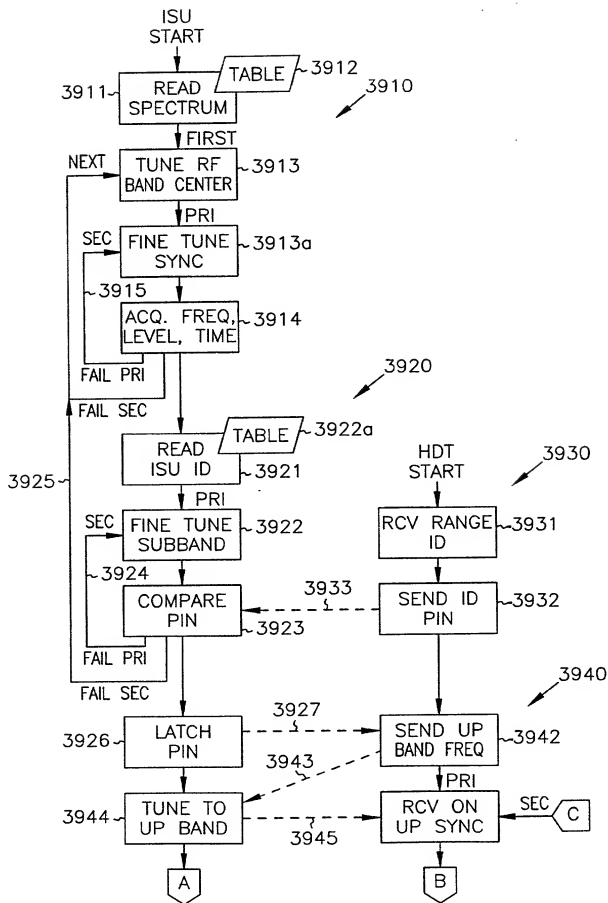
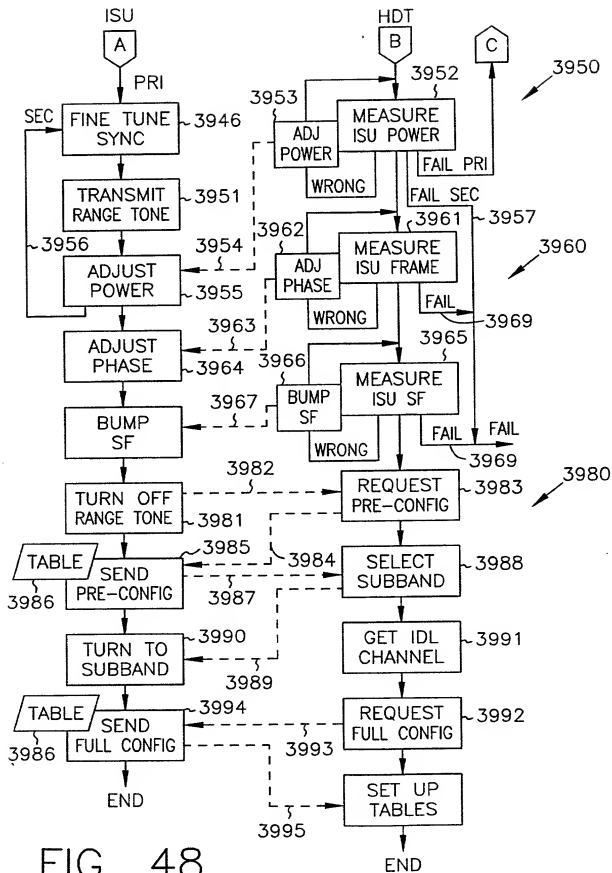


FIG. 47





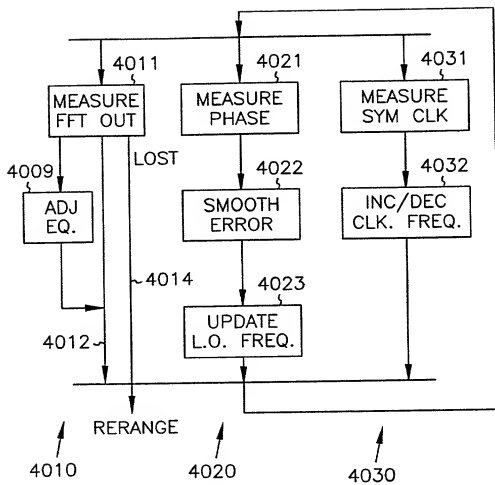


FIG. 49

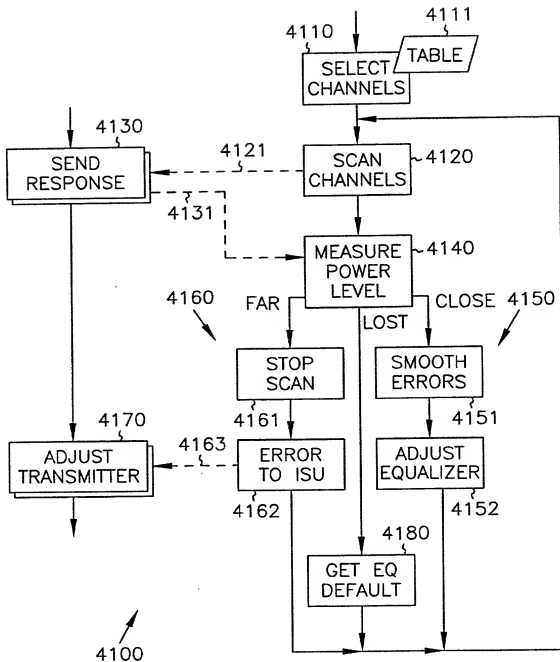


FIG. 50

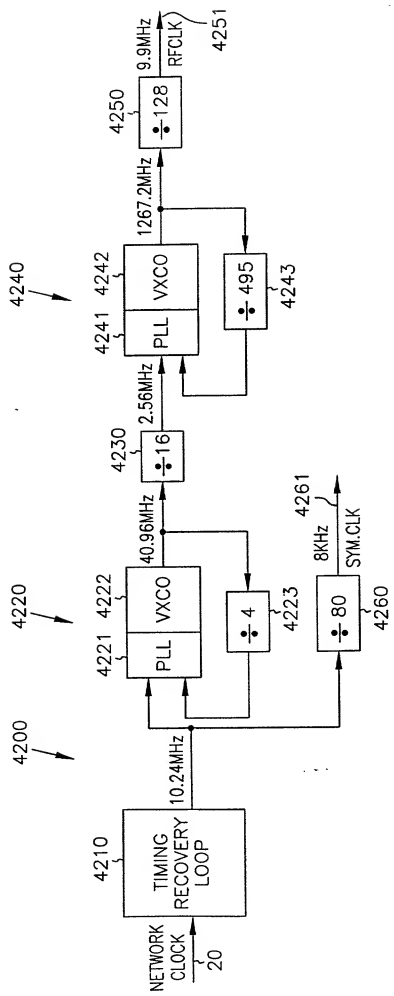


FIG. 51

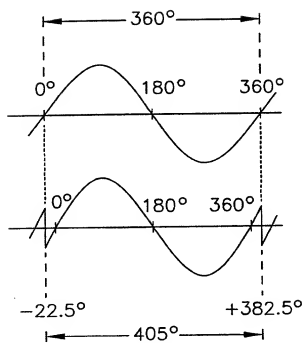


FIG. 52

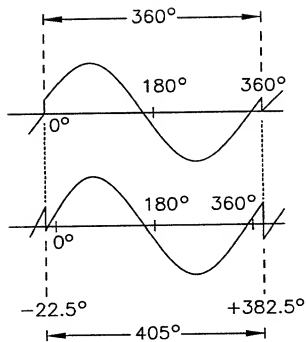
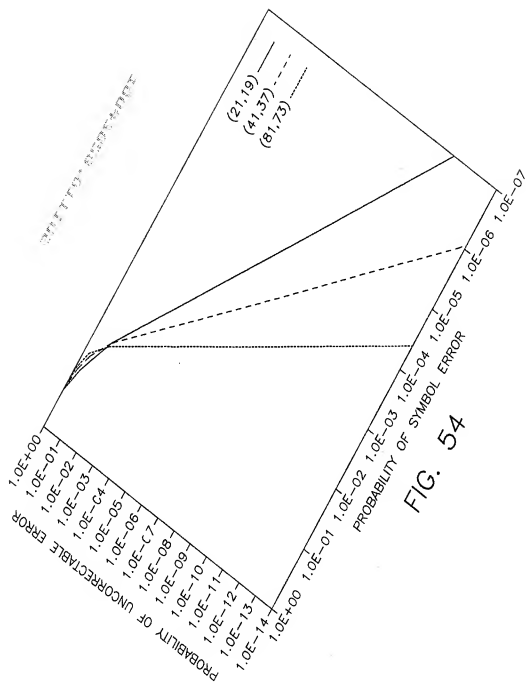


FIG. 53



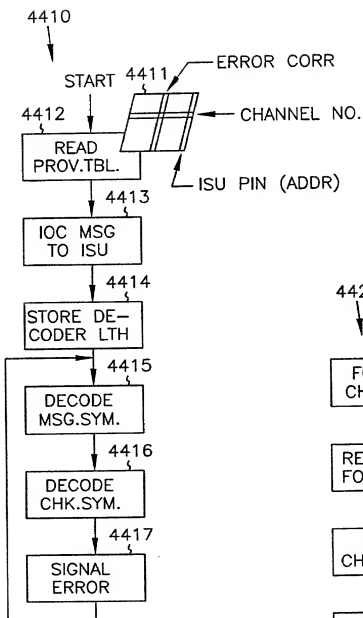


FIG. 55

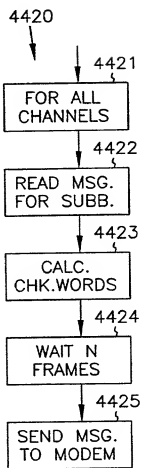


FIG. 56

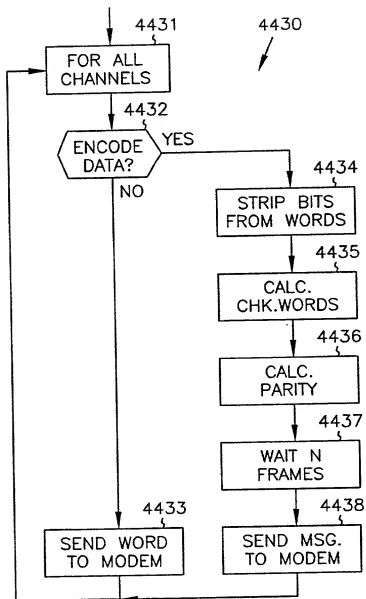
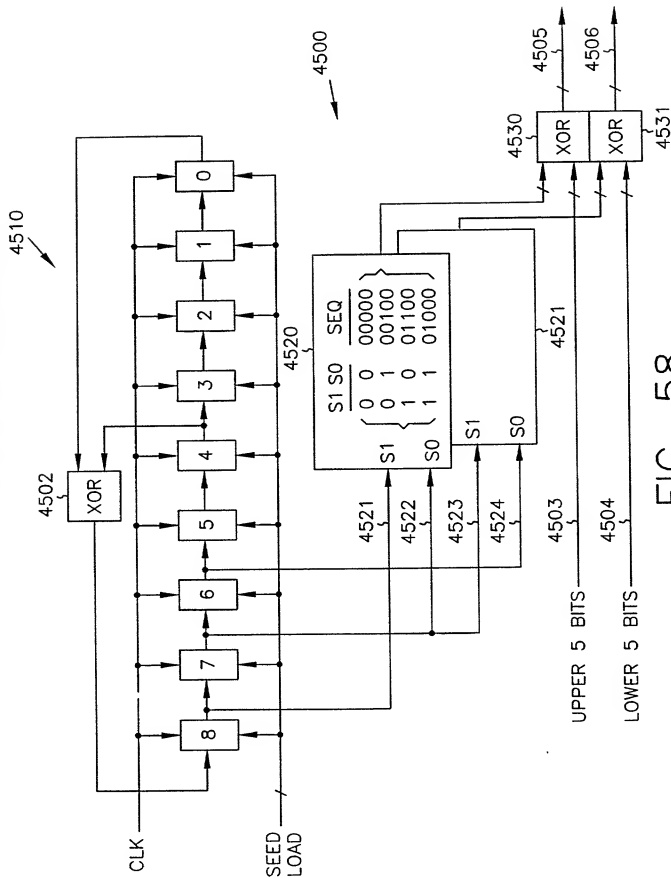


FIG. 57





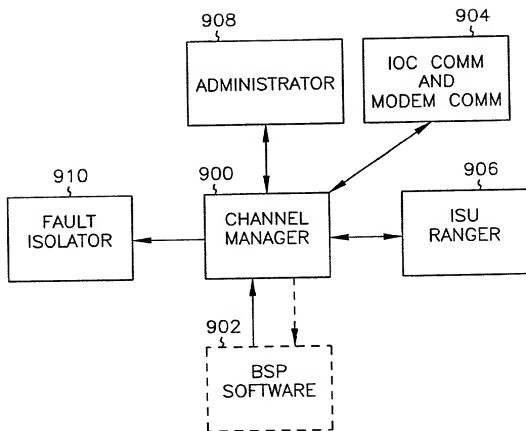


FIG. 59

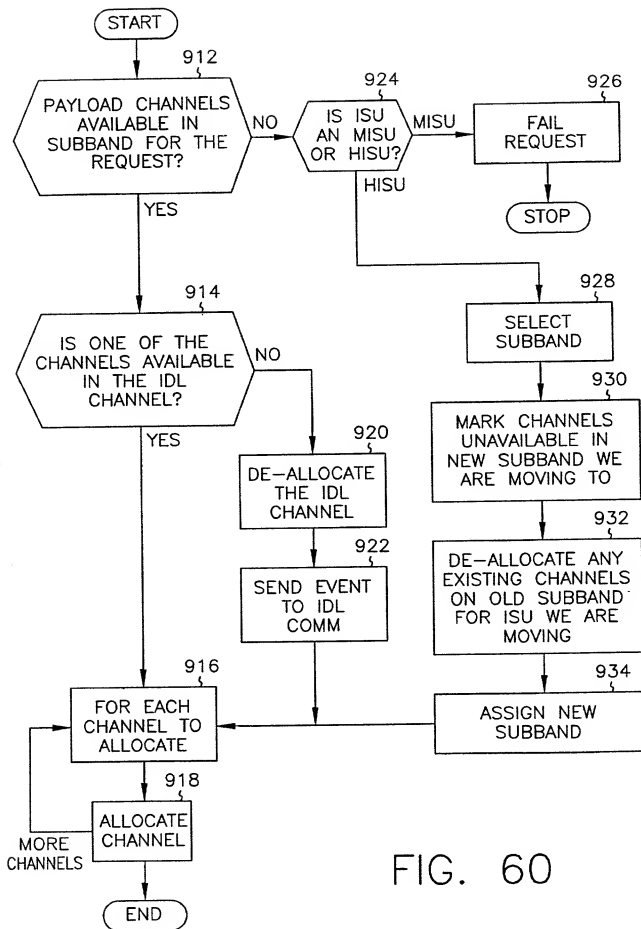


FIG. 60

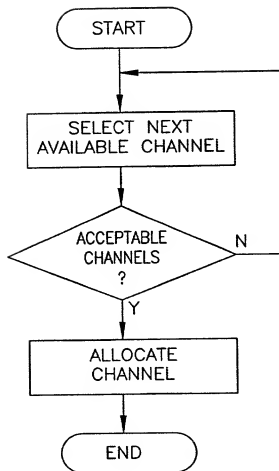


FIG. 61

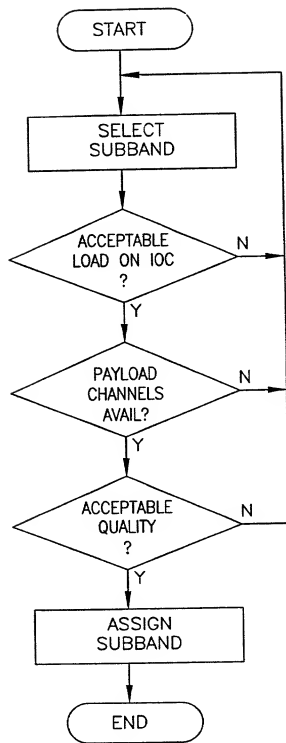


FIG. 62

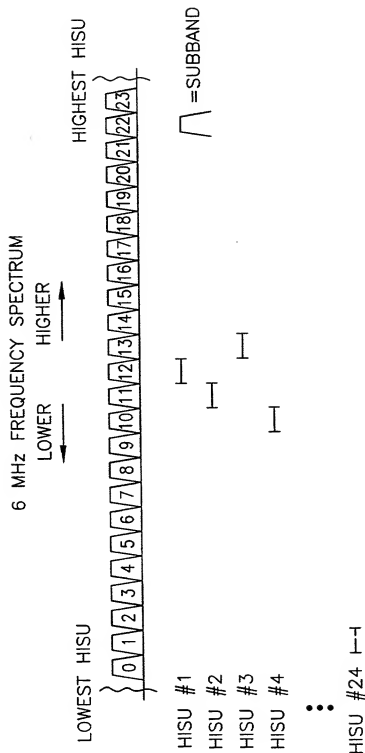


FIG. 63

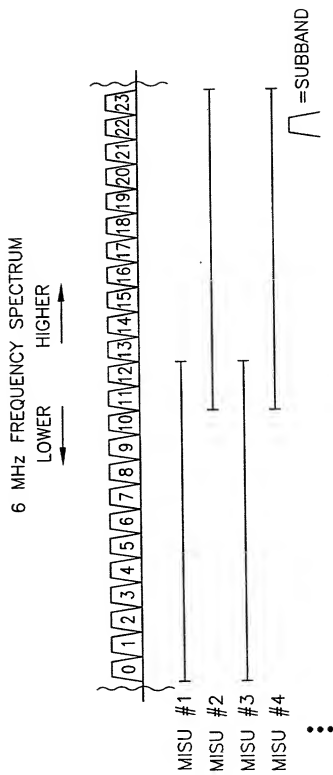


FIG. 64

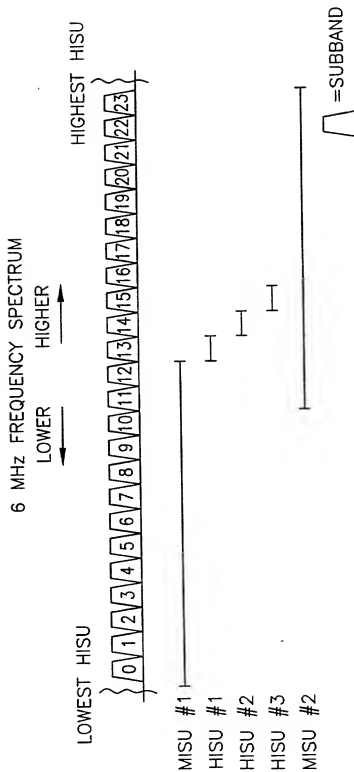


FIG. 65

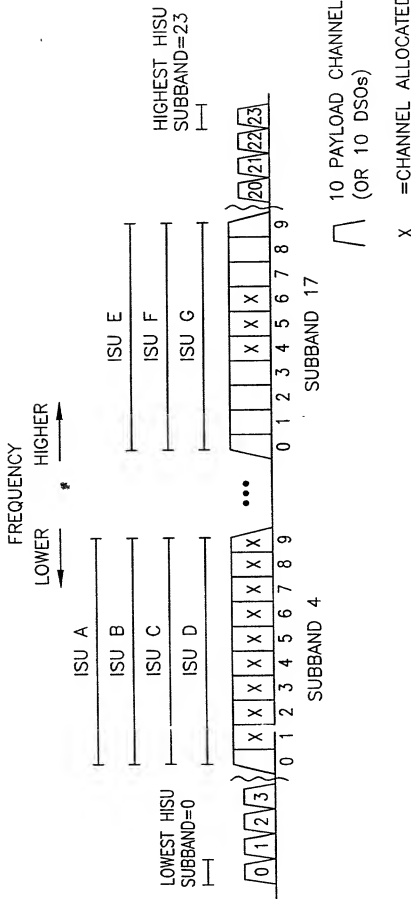


FIG. 66



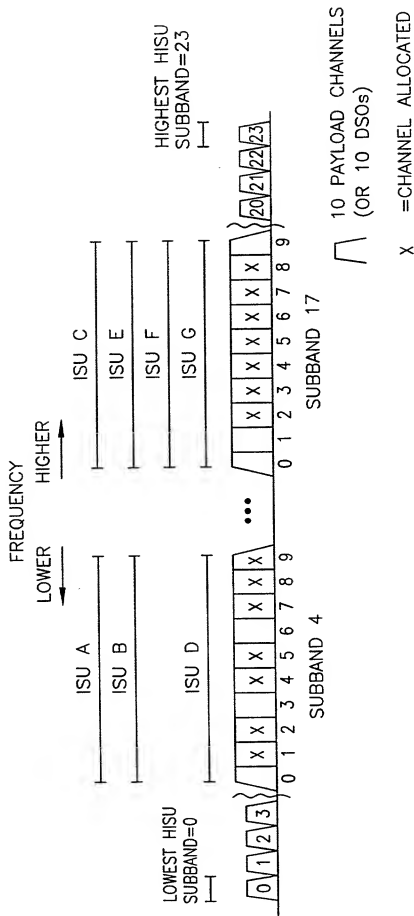


FIG. 67

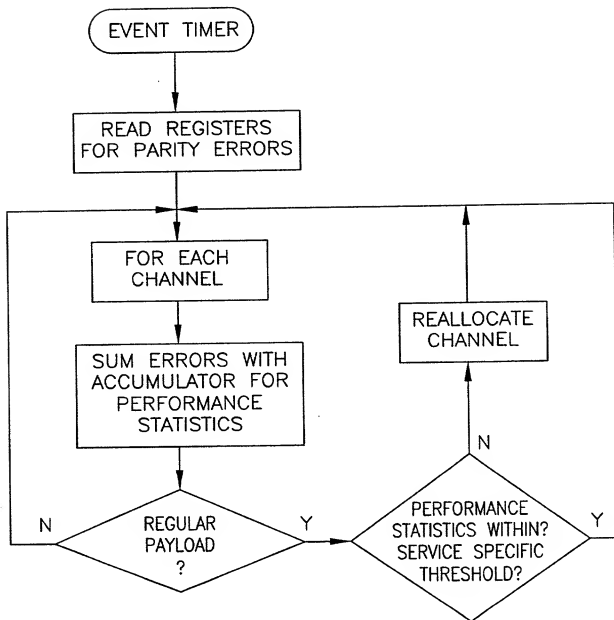


FIG. 68

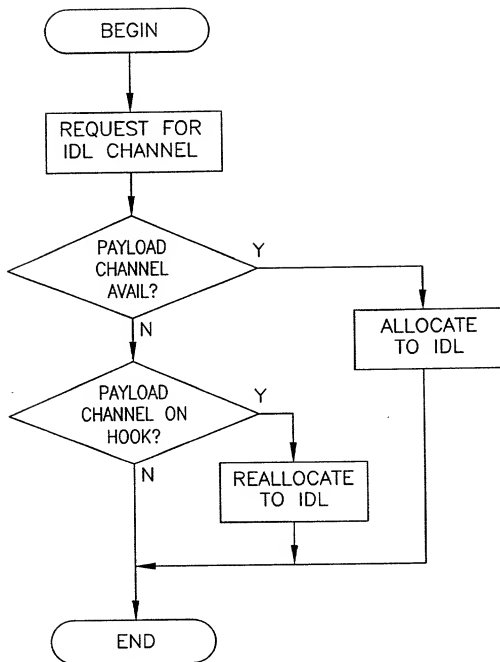


FIG. 69

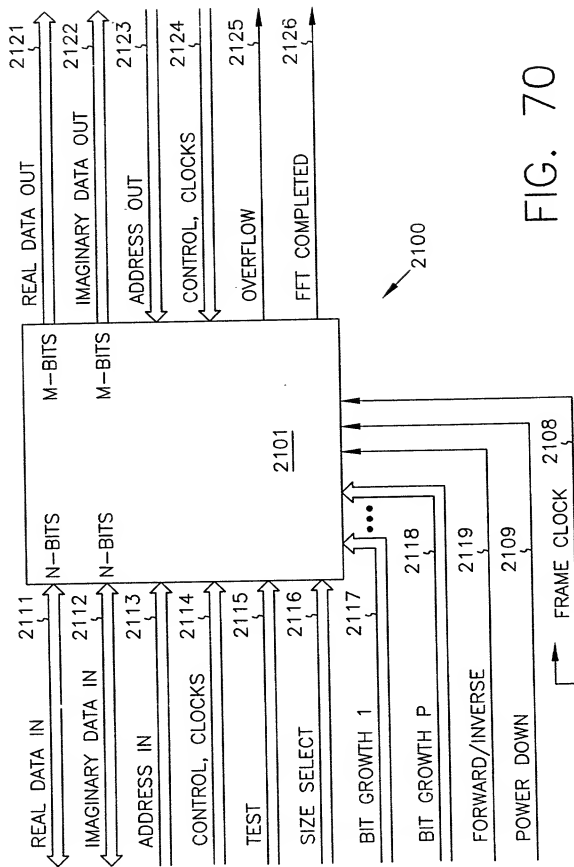


FIG. 70

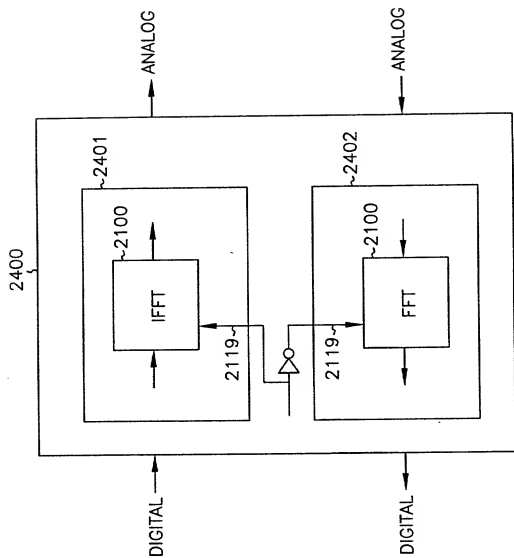


FIG. 71

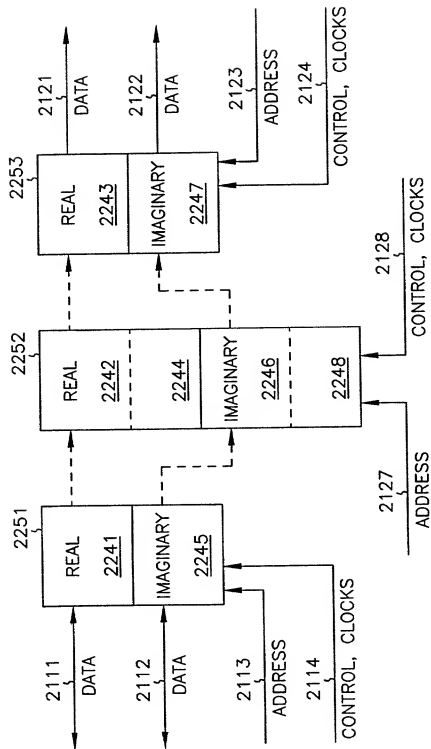


FIG. 72

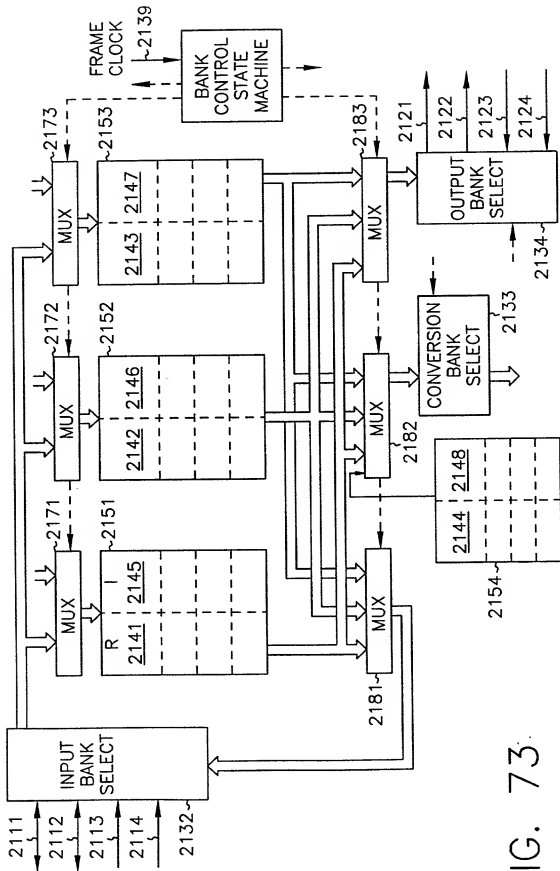
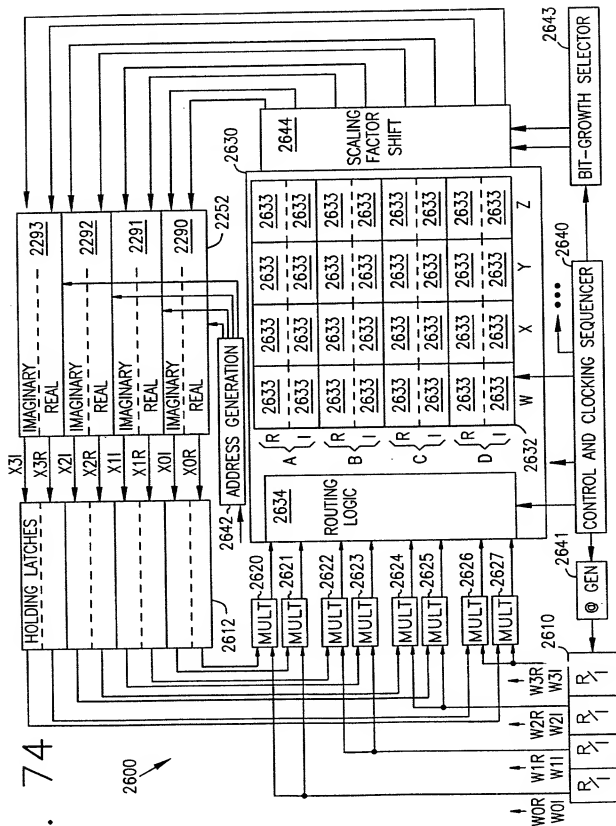


FIG. 73.

FIG. 74





THIS TABLE SHOWS THE ORDER OF CALCULATION FOR A TRANSPOSED BUTTERFLY:

C0

AWR=WR AWI=WI	AXR=XR AXI=XI	AYR=YR AYI=YI	AZR=ZR AZI=ZI
BWR=WR BWI=WI	BXR=XR BXI=XI	BYR=YR BYI=YI	BZR=ZR BZI=ZI
CWR=WR CWI=WI	CXR=XR CXI=XI	CYR=YR CYI=YI	CZR=ZR CZI=ZI
DWR=WR DWI=WI	DXR=XR DXI=XI	DYR=YR DYI=YI	DZR=ZR DZI=ZI

FIG. 75

C1

AWR=AWR - WI AWI=AWI + WR	AXR=AXR - XI AXI=AXI + XR	AYR=AYR - YI AYI=AYI + YR	AZR=AZR - ZI AZI=AZI + ZR
BWR=BWR - WI BWI=BWI + WR	BXR=BXR - XI BXI=BXI + XR	BYR=BYR - YI BYI=BYI + YR	BZR=BZR - ZI BZI=BZI + ZR
CWR=CWR - WI CWI=CWI + WR	CXR=CXR - XI CXI=CXI + XR	CYR=CYR - YI CYI=CYI + YR	CZR=CZR - ZI CZI=CZI + ZR
DWR=DWR - WI DWI=DWI + WR	DXR=DXR - XI DXI=DXI + XR	DYR=DYR - YI DYI=DYI + YR	DZR=DZR - ZI DZI=DZI + ZR

FIG. 76

C2

~2632

AWR=AWR +WR AWI=AWI +WI	AXR=AXR +XI AXI=AXI -XR	AYR=AYR -YR AYI=AYI -YI	AZR=AZR -ZI AZI=AZI +ZR
BWR=BWR +WR BWI=BWI +WI	BXR=BXR +XI BXI=BXI -XR	BYR=BYR -YR BYI=BYI -YI	BZR=BZR -ZI BZI=BZI +ZR
CWR=CWR +WR CWI=CWI +WI	CXR=CXR +XI CXI=CXI -XR	CYR=CYR -YR CYI=CYI -YI	CZR=CZR -ZI CZI=CZI +ZR
DWR=DWR +WR DWI=DWI +WI	DXR=DXR +XI DXI=DXI -XR	DYR=DYR -YR DYI=DYI -YI	DZR=DZR -ZI DZI=DZI +ZR

2800

FIG. 77

C3

~2632

AWR=AWR -WI AWI=AWI +WR	AXR=AXR +XR AXI=AXI +XI	AYR=AYR +YI AYI=AYI -YR	AZR=AZR -ZR AZI=AZI -ZI
BWR=BWR -WI BWI=BWI +WR	BXR=BXR +XR BXI=BXI +XI	BYR=BYR +YI BYI=BYI -YR	BZR=BZR -ZR BZI=BZI -ZI
CWR=CWR -WI CWI=CWI +WR	CXR=CXR +XR CXI=CXI +XI	CYR=CYR +YI CYI=CYI -YR	CZR=CZR -ZR CZI=CZI -ZI
DWR=DWR -WI DWI=DWI +WR	DXR=DXR +XR DXI=DXI +XI	DYR=DYR +YI DYI=DYI -YR	DZR=DZR -ZR DZI=DZI -ZI

2800

FIG. 78

C4

~2632

AWR=AWR +WR AWI=AWI +WI	AXR=AXR -XR AXI=AXI -XI	AYR=AYR +YR AYI=AYI +YI	AZR=AZR -ZR AZI=AZI -ZI
BWR=BWR +WR BWI=BWI +WI	BXR=BXR -XR BXI=BXI -XI	BYR=BYR +YR BYI=BYI +YI	BZR=BZR -ZR BZI=BZI -ZI
CWR=CWR +WR CWI=CWI +WI	CXR=CXR -XR CXI=CXI -XI	CYR=CYR +YR CYI=CYI +YI	CZR=CZR -ZR CZI=CZI -ZI
DWR=DWR +WR DWI=DWI +WI	DXR=DXR -XR DXI=DXI -XI	DYR=DYR +YR DYI=DYI +YI	DZR=DZR -ZR DZI=DZI -ZI

2800

FIG. 79

C5

~2632

AWR=AWR -WI AWI=AWI +WI	AXR=AXR +XI AXI=AXI -XR	AYR=AYR -YI AYI=AYI +YR	AZR=AZR +ZI AZI=AZI -ZR
BWR=BWR -WI BWI=BWI +WI	BXR=BXR +XI BXI=BXI -XR	BYR=BYR -YI BYI=BYI +YR	BZR=BZR +ZI BZI=BZI -ZR
CWR=CWR -WI CWI=CWI +WI	CXR=CXR +XI CXI=CXI -XR	CYR=CYR -YI CYI=CYI +YR	CZR=CZR +ZI CZI=CZI -ZR
DWR=DWR -WI DWI=DWI +WI	DXR=DXR +XI DXI=DXI -XR	DYR=DYR -YI DYI=DYI +YR	DZR=DZR +ZI DZI=DZI -ZR

2800

FIG. 80

C6

~2632

2800 ↗

AWR=AWR +WR AWI=AWI +WI	AXR=AXR -XI AXI=AXI +XR	AYR=AYR -YR AYI=AYI -YI	AZR=AZR +ZI AZI=AZI -ZR
BWR=BWR +WR BWI=BWI +WI	BXR=BXR -XI BXI=BXI +XR	BYR=BYR -YR BYI=BYI -YI	BZR=BZR +ZI BZI=BZI -ZR
CWR=CWR +WR CWI=CWI +WI	CXR=CXR -XI CXI=CXI +XR	CYR=CYR -YR CYI=CYI -YI	CZR=CZR +ZI CZI=CZI -ZR
DWR=DWR +WR DWI=DWI +WI	DXR=DXR -XI DXI=DXI +XR	DYR=DYR -YR DYI=DYI -YI	DZR=DZR +ZI DZI=DZI -ZR

FIG. 81

C7

~2632

2800 ↗

AWR=AWR -WI AWI=AWI +WR	AXR=AXR -XR AXI=AXI -XI	AYR=AYR +YI AYI=AYI -YR	AZR=AZR -ZR AZI=AZI +ZI
BWR=BWR -WI BWI=BWI +WR	BXR=BXR -XR BXI=BXI -XI	BYR=BYR +YI BYI=BYI -YR	BZR=BZR -ZR BZI=BZI +ZI
CWR=CWR -WI CWI=CWI +WR	CXR=CXR -XR CXI=CXI -XI	CYR=CYR +YI CYI=CYI -YR	CZR=CZR -ZR CZI=CZI +ZI
DWR=DWR -WI DWI=DWI +WR	DXR=DXR -XR DXI=DXI -XI	DYR=DYR +YI DYI=DYI -YR	DZR=DZR -ZR DZI=DZI +ZI

FIG. 82

THIS TABLE SHOWS THE ORDER OF CALCULATION FOR A TRANSPOSED BUTTERFLY:

C0

AWR = WR+XR+YR+ZR AWI = WI+XI+YI+ZI		AXR = WR-XI-YR+ZI AXI = WI+XR-YI-ZR		AYR = WR-XR+YR-ZR AYI = WI-XI+YI-ZI		AZR = WR+XI-YR-ZI AZI = WI-XR-YI+ZR	
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

2810

FIG. 83

C1

AWR = AWR-(WI+XI+YI+ZI) AWI = AWI+(WR+XR+YR+ZR)		AXR = AXR-(WI+XR-YI-ZR) AXI = AXI+(WR-XI-YR+ZI)		AYR = AYR-(WI-XI+YI-ZI) AYI = AYI+(WR-XR+YR-ZR)		AZR = AZR-(WI-XR-YI+ZR) AZI = AZI+(WR+XI-YR-ZI)	
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

2810

FIG. 84

2632

2810

C2	-	-	-	-	-
	-	-	-	-	-
	$BWR = WR + XR + YR + ZR$ $BWI = WI + XI + YI + ZI$	$BXR = WR - XI - YR + ZI$ $BXI = WI + XR - YI - ZR$	$BYR = WR - XR + YR - ZR$ $BYI = WI - XI + YI - ZI$	$BZR = WR + XI - YR - ZI$ $BZI = WI - XR - YI + ZR$	
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

FIG. 85

2632

2810

C3	-	-	-	-	-
	-	-	-	-	-
	$BWR = BWR - (WI + XI + YI + ZI)$ $BWI = BWI + (WR + XR + YR + ZR)$	$BXR = BXR - (WI + XR - YI - ZR)$ $BXI = BXI + (WR - XI - YR + ZI)$	$BYR = BYR - (WI - XI + YI - ZI)$ $BYI = BYI + (WR - XR + YR - ZR)$	$BZR = BZR - (WI - XR - YI + ZR)$ $BZI = BZI + (WR + XI - YR - ZI)$	
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

FIG. 86

C4						2632
-	-	-	-	-	-	
-	-	-	-	-	-	
-	-	-	-	-	-	
-	-	-	-	-	-	
CWR = WR+XR+YR+ZR	CXR = WR-XI-YR+ZI	CYR = WR-XR+YR-ZR	CZR = WR+XI-YR-ZI			
CWI = WI+XI+YI+ZI	CXI = WI+XR-YI-ZR	CYI = WI-XI+YI-ZI	CZI = WI-XR-YI+ZR			
-	-	-	-	-	-	
-	-	-	-	-	-	

FIG. 87

C5						2632
-	-	-	-	-	-	2810
-	-	-	-	-	-	
-	-	-	-	-	-	
-	-	-	-	-	-	
CWR = CWR - (WI + XI + YI + ZI)	CXR = CXR - (WI + XR - YI - ZR)	CYR = CYR - (WI - XI + YI - ZI)	CZR = CZR - (WI - XR - YI + ZR)			
CWI = CWI + (WR + XR + YR + ZR)	CXI = CXI + (WR - XI - YR + ZI)	CYI = CYI + (WR - XR + YR - ZR)	CZI = CZI + (WR + XI - YR - ZI)			
-	-	-	-	-	-	
-	-	-	-	-	-	

C6

2632

2810

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
DWR = WR+XR+YR+ZR DWI = WI+XI+YI+ZI	DXR = WR-XI-YR+ZI DXI = WI+XR-YI-ZR	DYR = WR-XR+YR-ZR DYI = WI-XI+YI-ZI	DZR = WR+XI-YR-ZI DZI = WI-XR-YI+ZR

FIG. 89

C7

2632

2810

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
DWR = DWR-(WI+XI+YI+ZI) DWI = DWI+(WR+XR+YR+ZR)	DXR = DXR-(WI+XR-YI-ZR) DXI = DXI+(WR-XI-YR+ZI)	DYR = DYR-(WI-XI+YI-ZI) DYI = DYI+(WR-XR+YR-ZR)	DZR = DZR-(WI-XR-YI+ZR) DZI = DZI+(WR+XI-YR-ZI)

FIG. 90



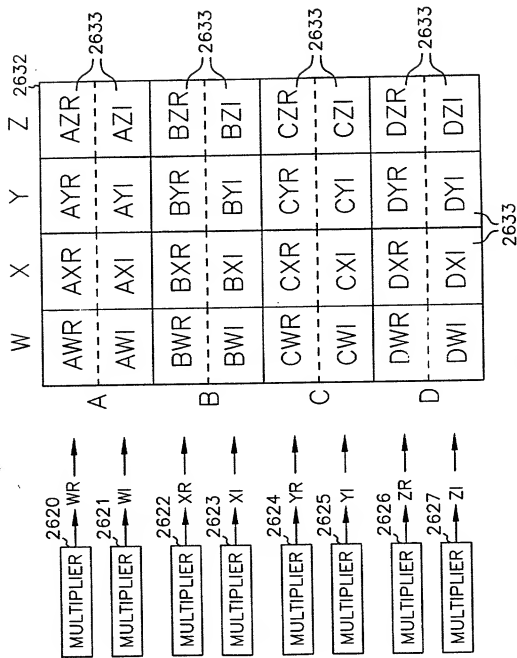


FIG. 91

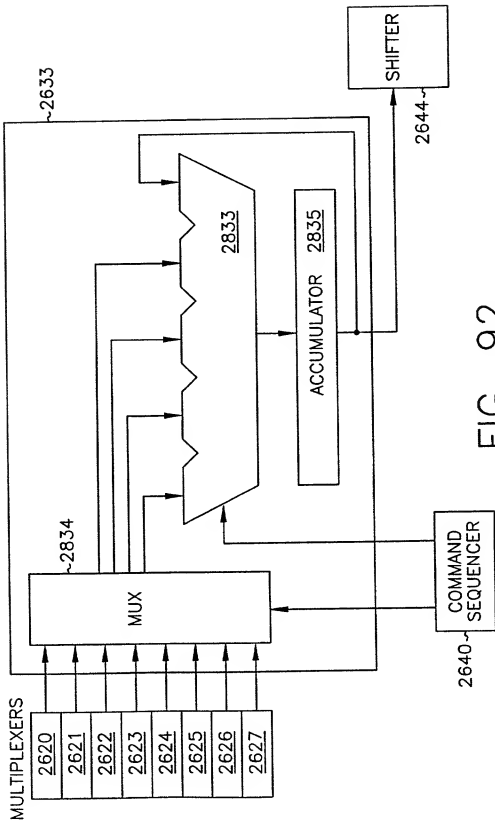


FIG. 92

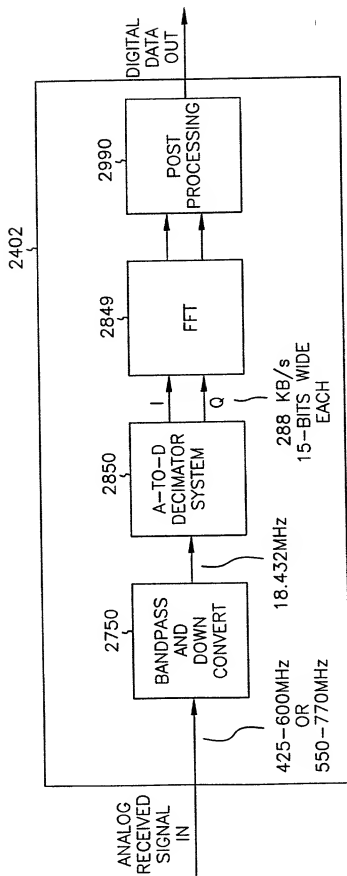


FIG. 93

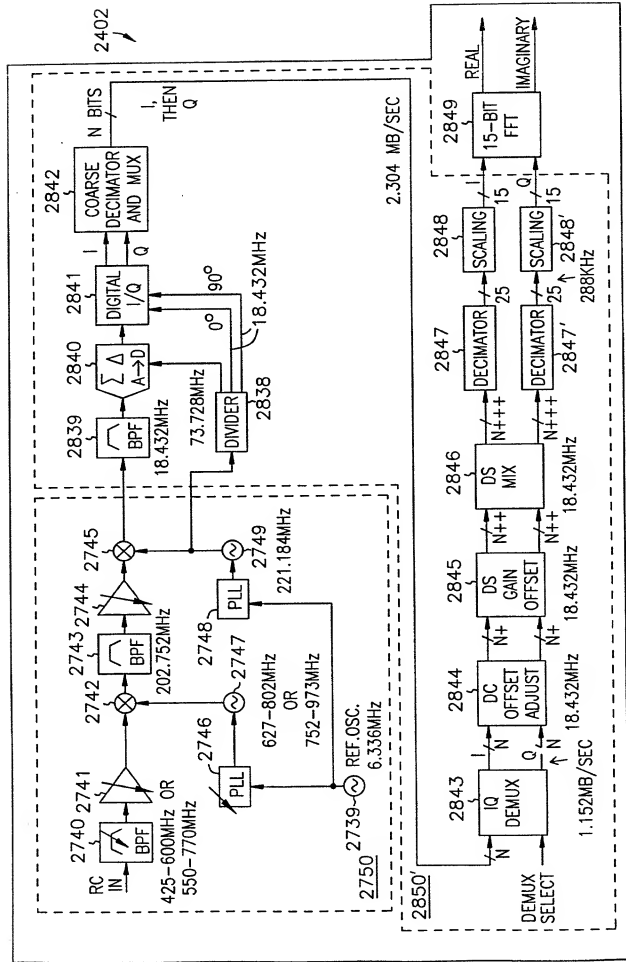


FIG. 94

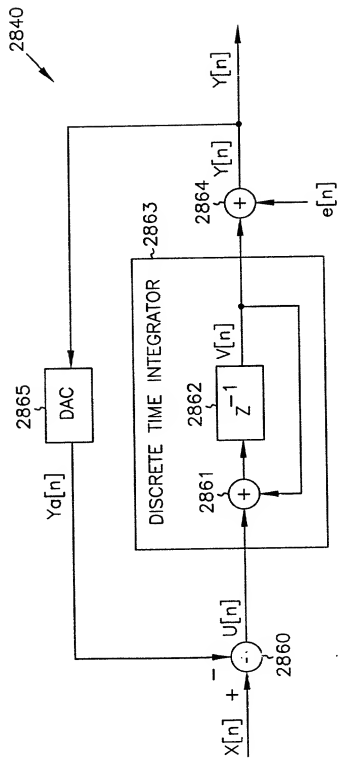


FIG. 95

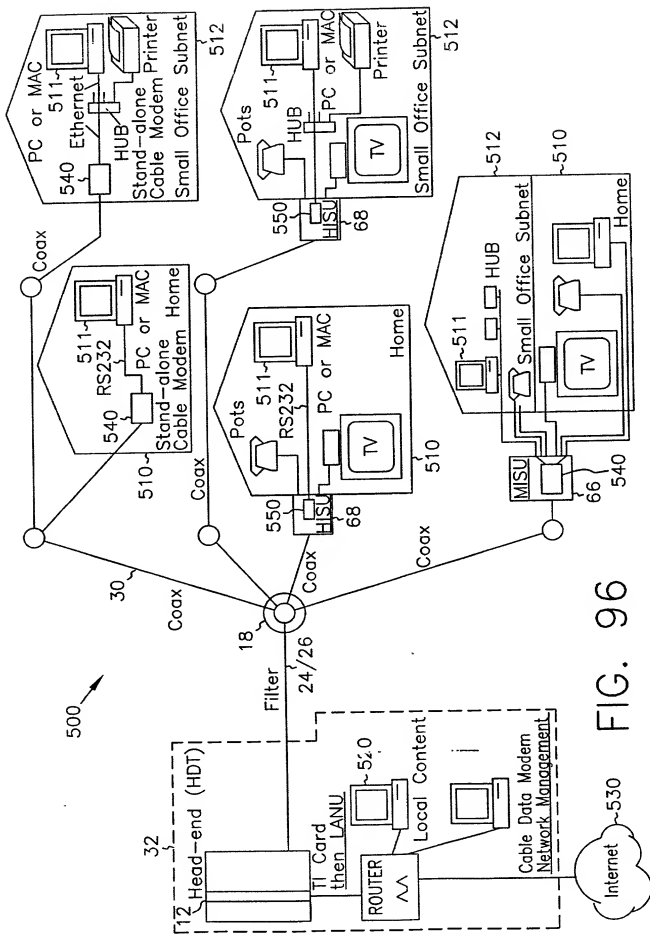


FIG. 96

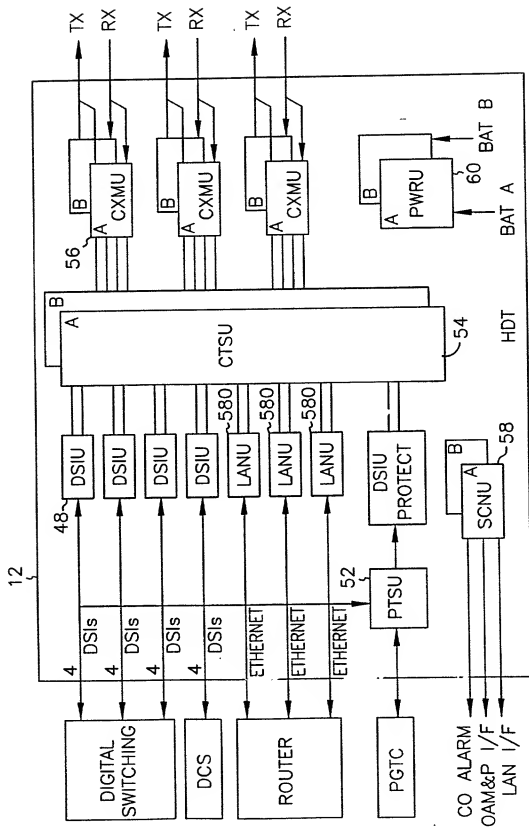


FIG. 97

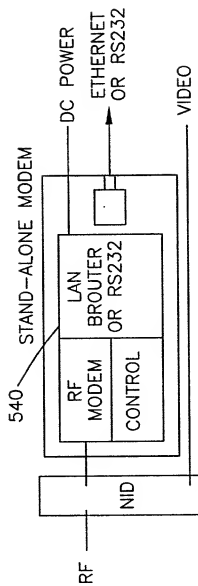
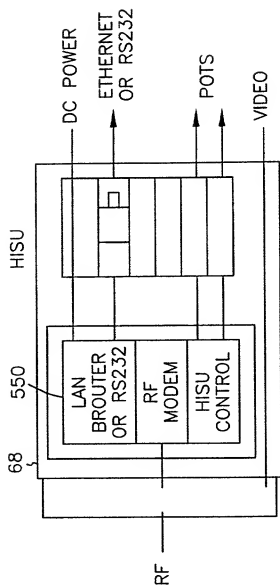


FIG. 98



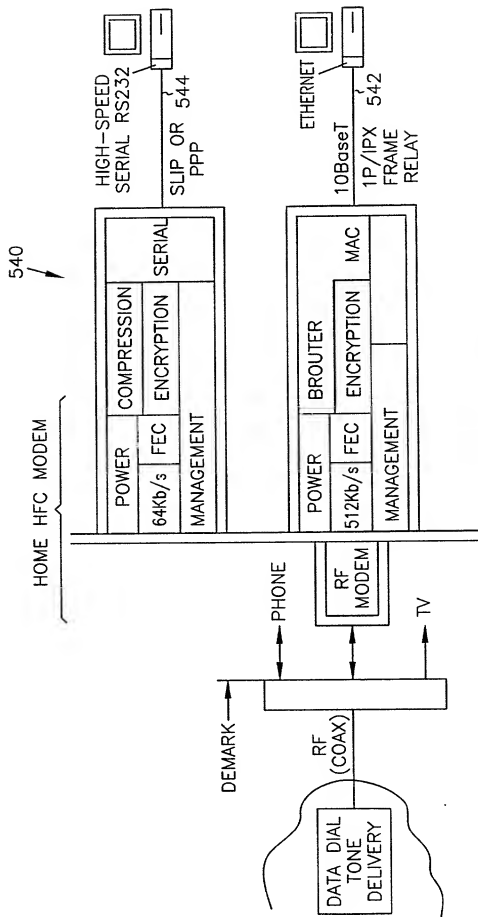


FIG. 99

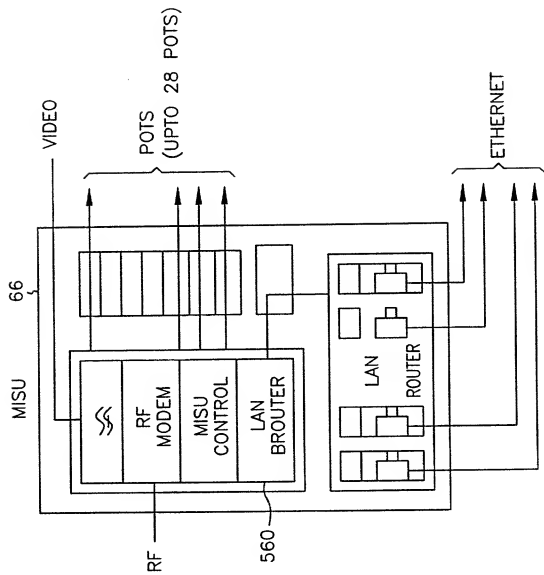


FIG. 100

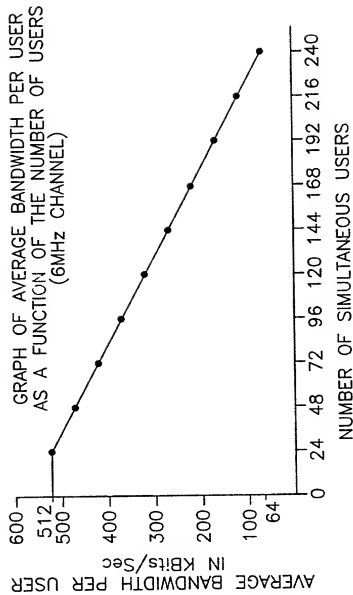
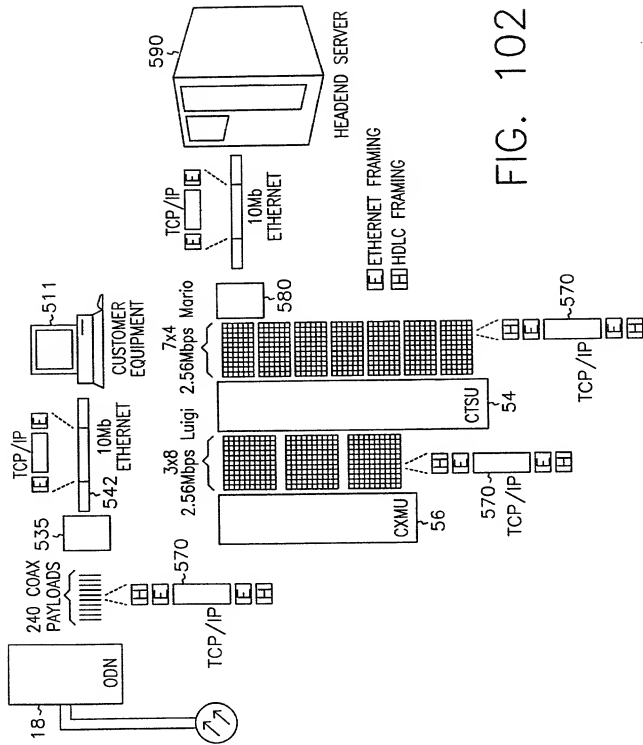


FIG. 101



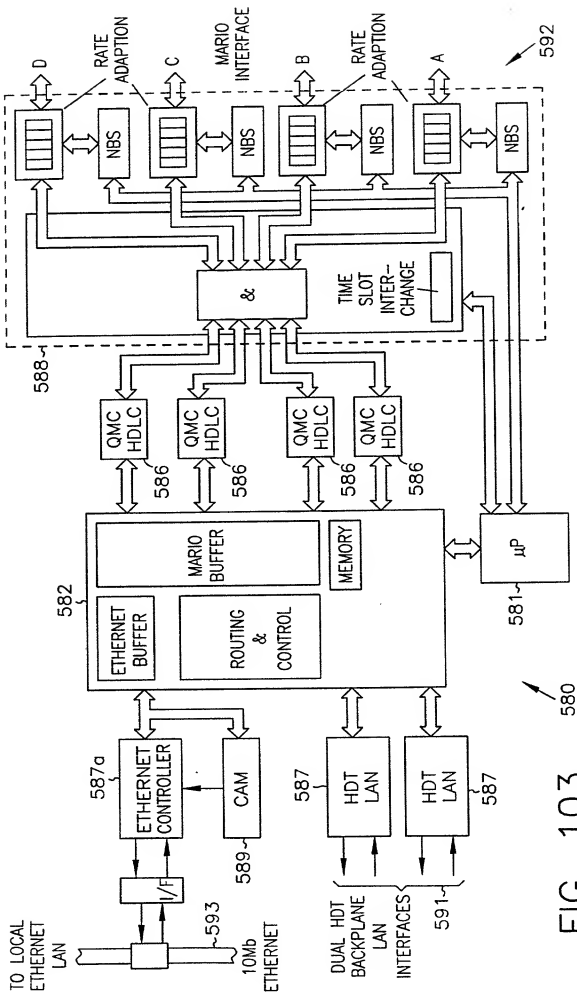


FIG. 103



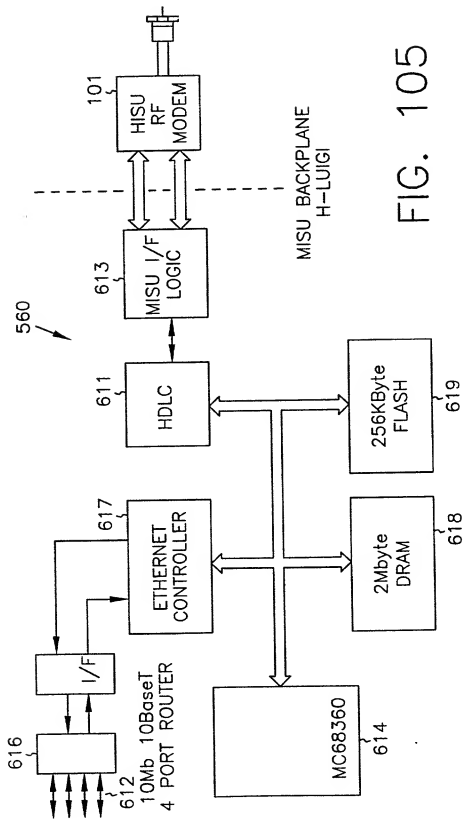


FIG. 105

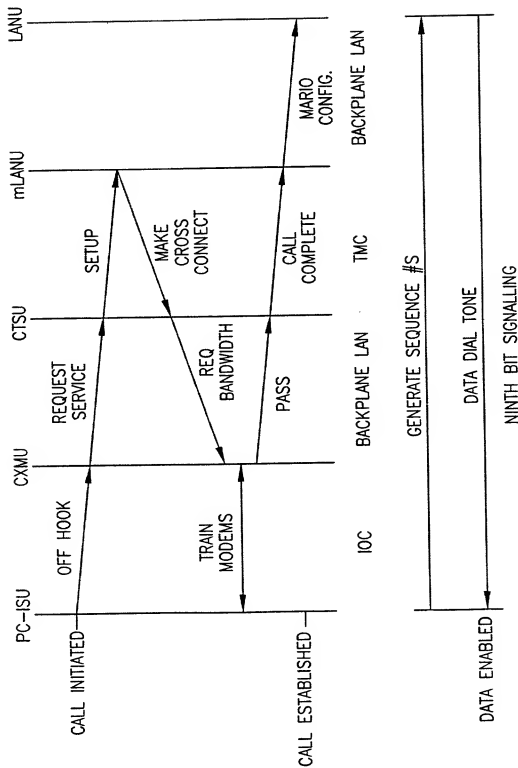


FIG. 106



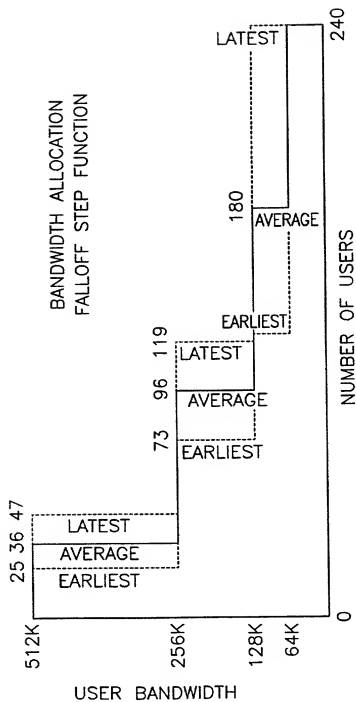


FIG. 107

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

THE RF SPECTRUM OF 24 USERS WITH 512Kbs

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

ADDING THE 25th USER

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

ADDING THE 26th USER, ETC

FIG. 108

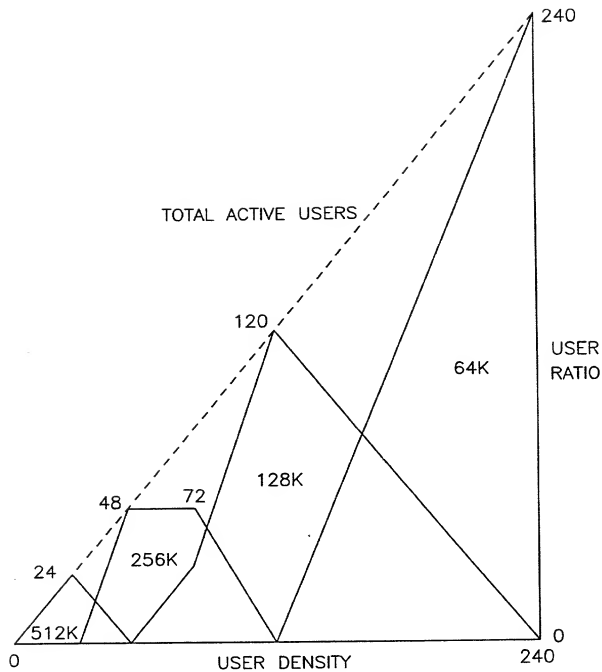


FIG. 109

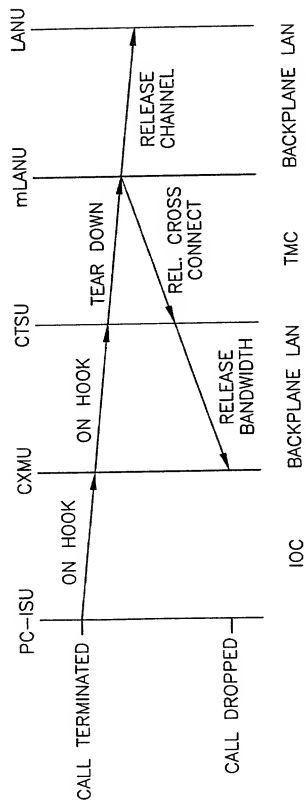


FIG. 110

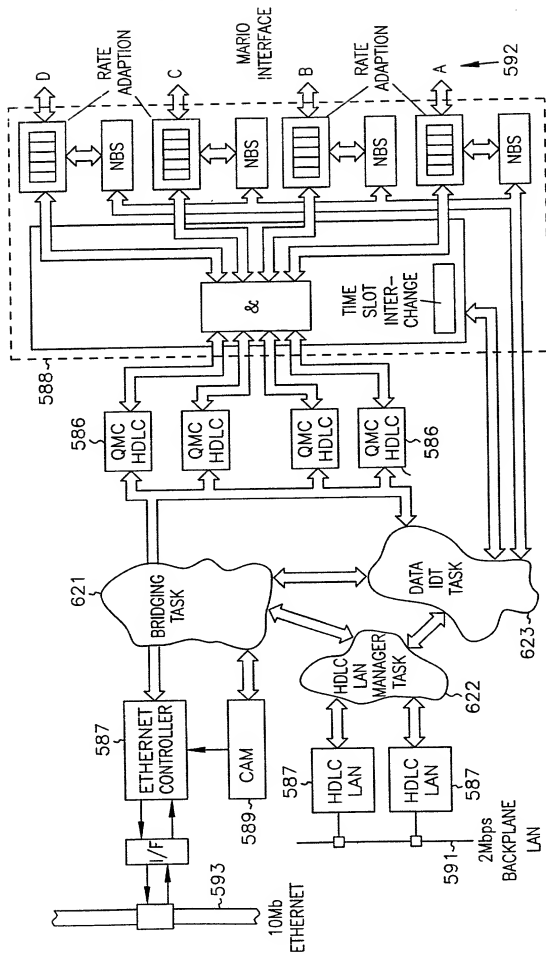


FIG. 111

620



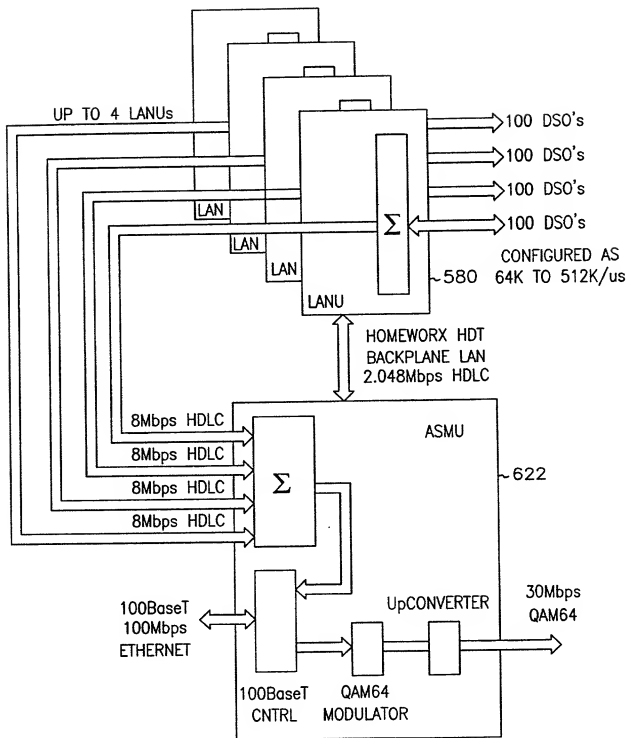


FIG. 113

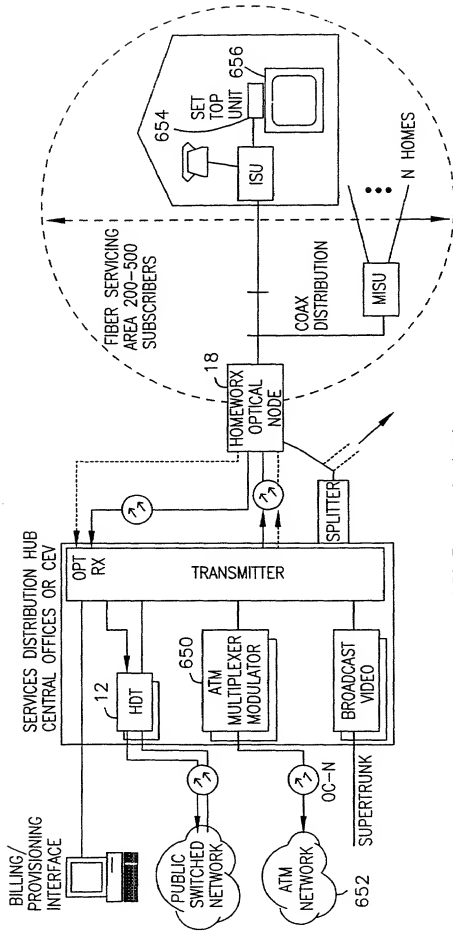


FIG. 114



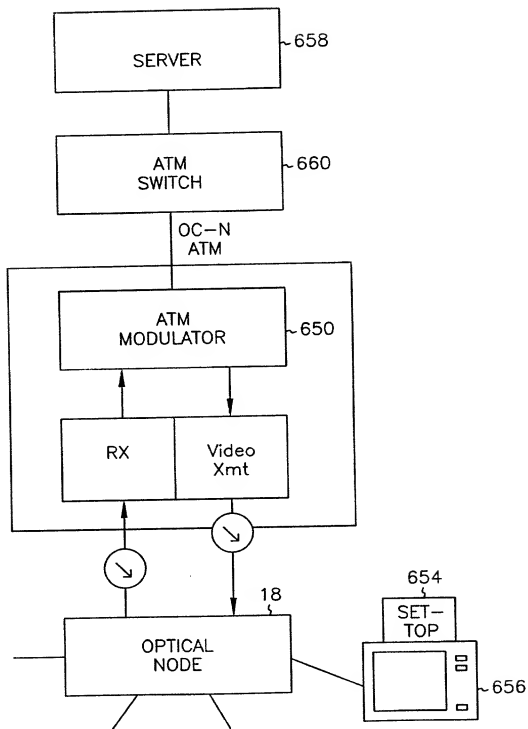


FIG. 115

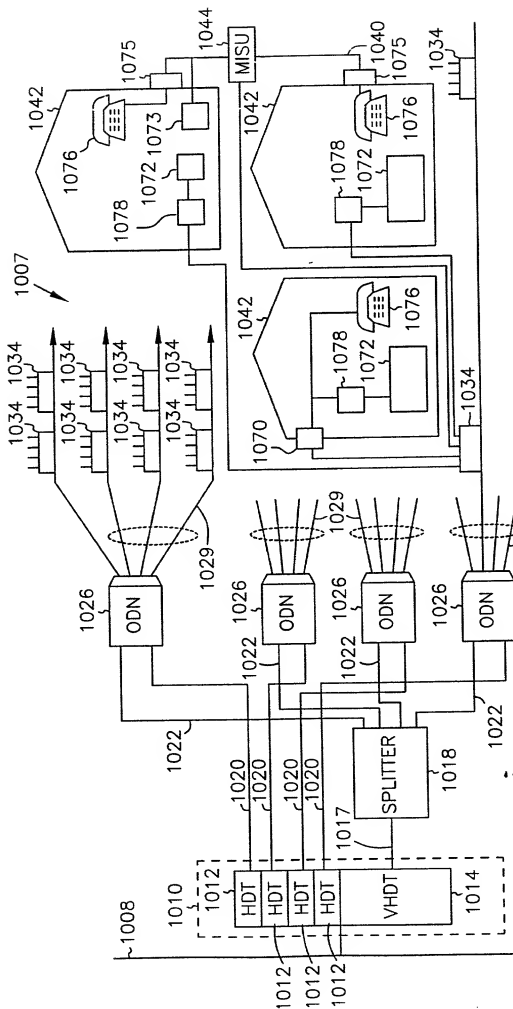
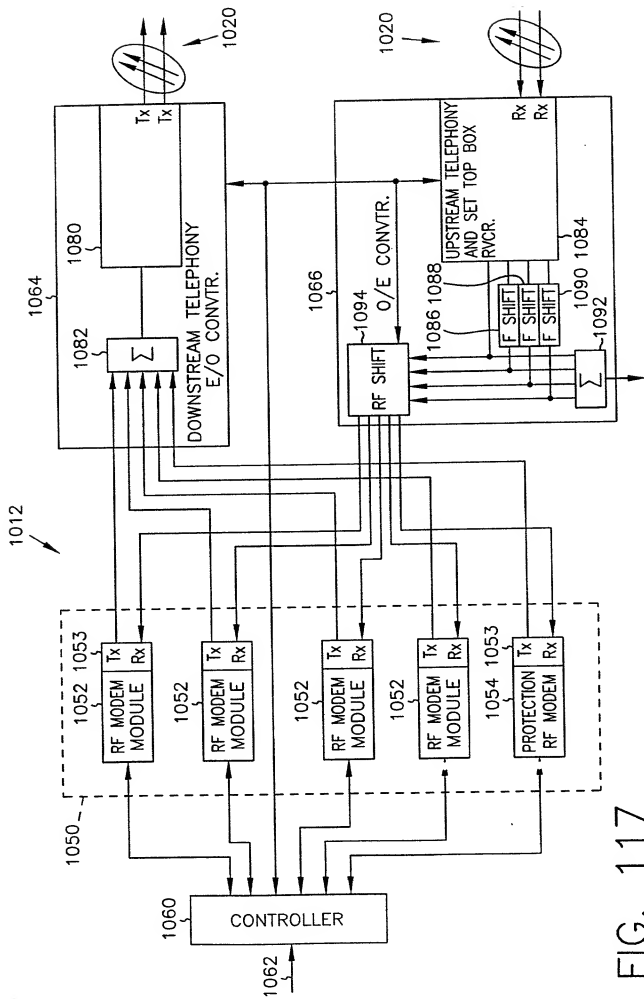


FIG. 116



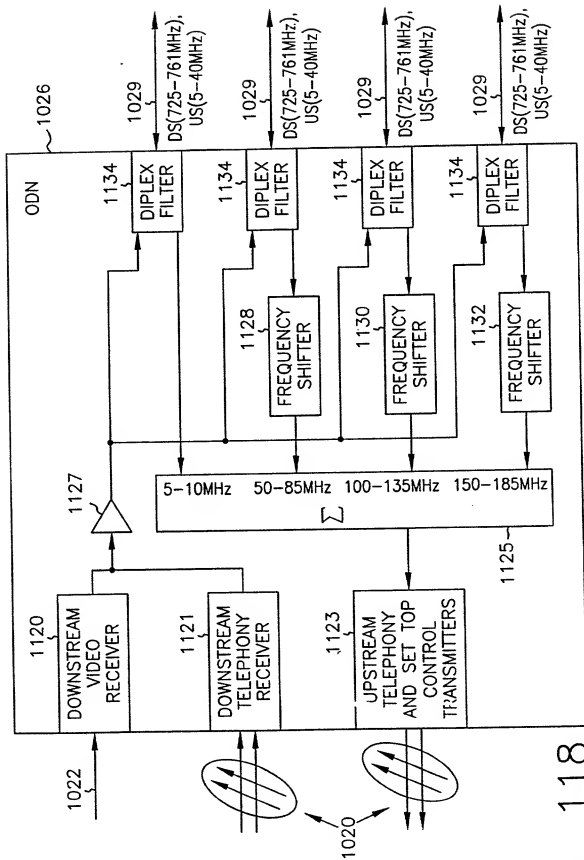


FIG. 118

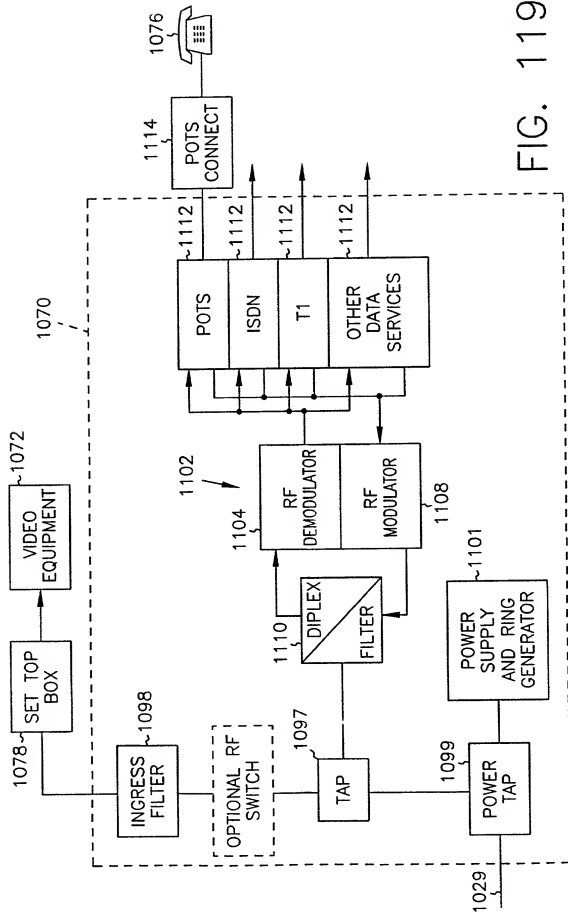


FIG. 119

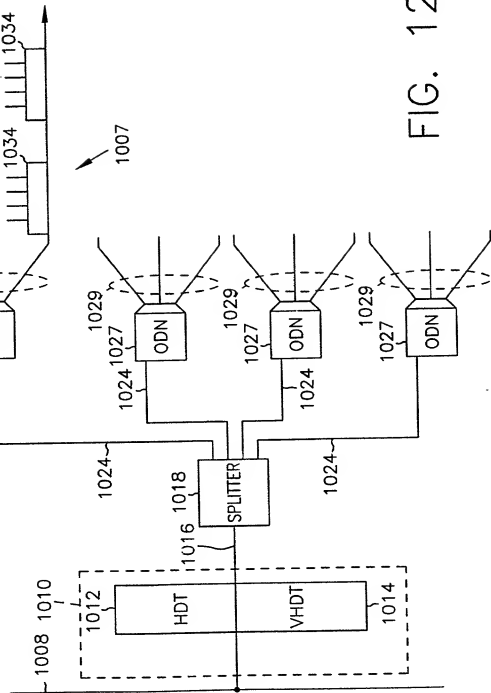


FIG. 120

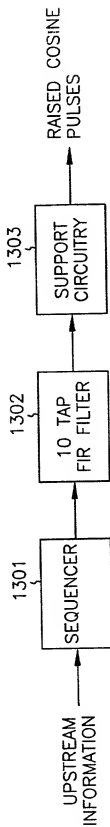


FIG. 121

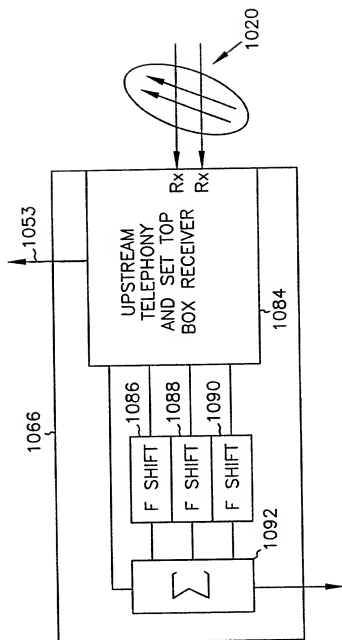


FIG. 122



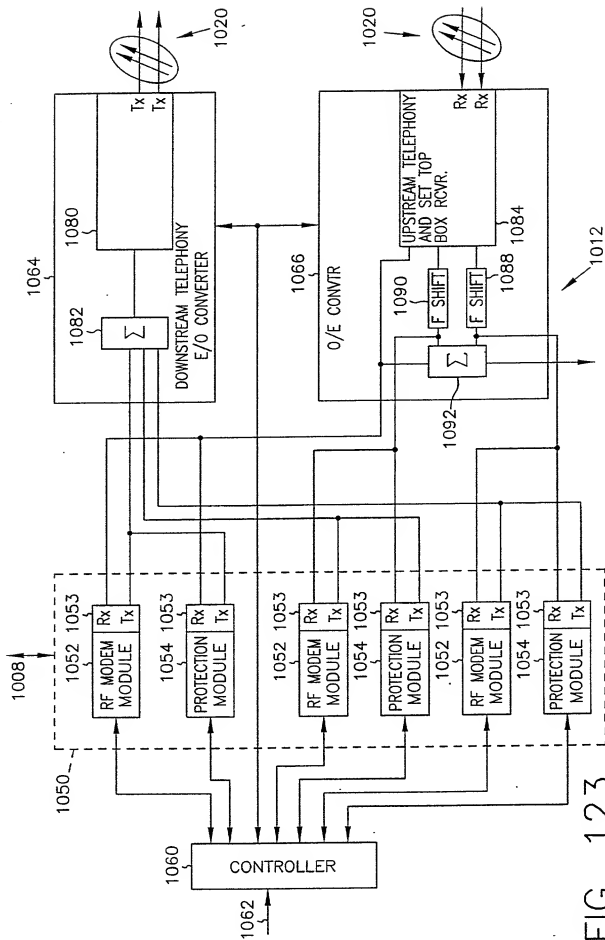


FIG. 123